AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

Received
APR 13 2021
ND Oil & Gas Division

Well File No.	
20552	
NDIC CTB No.	
120552	

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
MULLER 1-21-16H	SWSW	21	158 N	103 W	WILLIAMS

Operator	Telephone Number	Field
ENERPLUS RESOURCES (USA) CORP	(720) 279-5500	CLIMAX

Address	City	State	Zip Code
950 17TH STREET, SUITE 2200	DENVER	CO	80202

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
CONCORD ENERGY LLC	(303) 468-1900	100	March 10, 2021

Principal Place of Business	City	State	Zip Code
1401 17TH STR SUITE 1500	DENVER	CO	80016

Field Address	City	State	Zip Code
3804 17TH AVE NE	WATFORD CITY	ND	58854

Name of Transporter	Telephone Number	% Transported	Date Effective
CONCORD ENERGY TRANSPORTATION LLC	(701) 842-2580	100	March 10, 2021

Address	City	State	Zip Code
3804 17TH AVE NE	WATFORD CITY	ND	58854

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.

Date: March 26, 2021

Signature	Printed Name	Title
Jamie Krogh	JAMIE KROGH	OPERATIONS TECHNICIAN

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
	KIM ANTLE	OPERATIONS TECHNICIAN

FOR STATE USE ONLY

Date Approved	AUG 16 2021
By	Melissa Hess
Title	Oil & Gas Production Analyst

NOTICE OF TRANSFER OF OIL AND GAS WELLS - FORM 15

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5762 (03-2000)

JUN 2021
RECEIVED
ND OIL & GAS DIVISION

FOR STATE USE ONLY
NDIC Bond Number: 700291

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM. PLEASE SUBMIT THE ORIGINAL AND SIX COPIES.
THIS NOTICE ALONG WITH A FEE OF $25.00 PER WELL SHALL BE FILED AT LEAST THIRTY DAYS BEFORE THE CLOSING DATE OF TRANSFER.

TRANSFERRING OPERATOR

Name of Operator Representative: Nathan Fisher			
Operator Transferring Oil and/or Gas Wells: **Bruin E&P Operating, LLC**			Telephone Number: **(720) 279-5500**
Address: **602 Sawyer Street #710**	City: **Houston**	State: **TX**	Zip Code: **77007**
I, the above named representative, acknowledge the transfer of the oil and/or gas wells named below for the purpose of ownership and/or operation to the company named below.			
Signature:	Title (Must be an officer or power of attorney must be attached): VP-US Business Unit		Date: 6/21/21

Well File Number	Requested Official Well Name and Number	Location (Qtr-Qtr, S-T-R)	Assignment Date
	See attached well list.		3/10/21

RECEIVING OPERATOR

Name of Operator Representative: Nathan Fisher			
Operator Receiving Oil and/or Gas Wells: **Enerplus Resources (USA) Corporation**			Telephone Number: **(720) 279-5500**
Address: **950 17th Street Suite 2200**	City: **Denver**	State: **CO**	Zip Code: **80202**
I, the above named representative, have read the foregoing statement and accept such transfer, also the responsibility of ownership and/or operation of said well or wells, under the said company bond, said bond being tendered to or on file with the Industrial Commission of North Dakota.			
Signature:	Title (Must be an officer or power of attorney must be attached): VP-US Business Unit		Date: 6/21/21

SURETY COMPANY

Surety: **Liberty Mutual Surety**			Telephone Number: **(469) 997-6767**	Amount of Bond: **$ $100,000**
Address: **7900 Windrose Avenue**	City: **Plano**	State: **TX**	Zip Code: **75024**	Bond Number: **022225137**
The above named SURETY agrees that such bond shall extend to compliance with Chapter 38-08 of North Dakota Century Code and amendments and the rules and regulations of the Industrial Commission of North Dakota prescribed to govern the production of oil and gas on government and private lands within the State of North Dakota, in relation to the above stated transfer; it being further agreed and understood that the bond sum or amount is not to be considered increased because of such extension.				
Signature:	Title (Must be an officer or power of attorney must be attached): **Attorney-In-Fact**			Date: **June 18, 2021**
Printed Name: **Jennifer Winters**				

FOR STATE USE ONLY

Date Approved	August 3, 2021
By	Bruce E. Hicks
Title	Assistant Director

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

Certificate No: **8197876**

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Harold D. Binggeli, Cara D. Hancock, Jennifer Winters

all of the city of Lubbock state of TX each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 1st day of November, 2018.

LIBERTY MUTUAL INSURANCE COMPANY INCORPORATED 1912 MASSACHUSETTS — THE OHIO CASUALTY INSURANCE COMPANY INCORPORATED 1919 NEW HAMPSHIRE — WEST AMERICAN INSURANCE COMPANY INCORPORATED 1991 INDIANA

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

By: David M. Carey, Assistant Secretary

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 1st day of November, 2018 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.

TERESA PASTELLA COMMONWEALTH OF PENNSYLVANIA NOTARY PUBLIC

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS: Section 12 Power of Attorney.
Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 18th day of June, 2021.

LIBERTY MUTUAL INSURANCE COMPANY INCORPORATED 1912 MASSACHUSETTS — THE OHIO CASUALTY INSURANCE COMPANY INCORPORATED 1919 NEW HAMPSHIRE — WEST AMERICAN INSURANCE COMPANY INCORPORATED 1991 INDIANA

By: Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

File No	CTB No	Location	Well Name
1871		NENE 31-163-78	H. AND H. NORDMARK 1
16178	116178	NWNW 4-141-96	DVORAK 11-4H
16192	116192	SESE 32-142-97	PAVLICEK 44-32H
16282		SWSE 18-161-78	V&F JOHNSON-FCB 1-18
17234	117234	SESW 10-142-95	DVORAK 10-1H
17569		SWNW 3-163-78	KJELSHUS 5-3
17808	117808	SESW 14-141-96	SADOWSKY 24-14H
17961	117961	NWNW 27-141-95	KADRMAS 11-27H
17984	117984	LOT3 4-141-95	SICKLER STATE 21-4H
18056	118056	SWSE 12-141-97	SADOWSKY 34-12H
18094	218094	SESE 17-148-94	FORT BERTHOLD 148-94-17D-08-1H
18126	118126	SESW 17-152-93	FORT BERTHOLD 152-93-17C-08-1H
18206	218206	NWNE 2-147-94	FORT BERTHOLD 147-94-2A-11-1H
18272	118272	NWNE 10-141-96	JAEGER 1-10-15H-141-96
18313	218313	SWSE 35-148-94	FORT BERTHOLD 148-94-35D-26-1H
18332	118332	NWNE 25-148-94	FORT BERTHOLD 148-94-25A-36-1H
18335	118335	NWNE 22-148-94	FORT BERTHOLD 148-94-22A-27-1H
18341	218341	NWNE 1-147-94	FORT BERTHOLD 147-94-1A-12-1H
18367	118367	SESE 9-148-94	FORT BERTHOLD 148-94-9D-04-1H
18402	118402	SESE 22-152-94	FORT BERTHOLD 152-94-22D-15-1H
18426	218426	SWSW 14-152-94	FORT BERTHOLD 152-94-14C-11-1H
18446	218446	NENW 18-152-93	FORT BERTHOLD 152-93-18B-19-1H
18458	218458	NENE 3-147-94	FORT BERTHOLD 147-94-3A-10-1H
19048	119048	SESE 11-156-101	BORRUD 156-101-11D-2-1H
19088	119088	NENW 18-141-95	WOLBERG 21-18H
19103	219103	NENE 28-157-100	NJOS 157-100-28A-33-1H
19169	119169	NWNW 11-157-103	CARLSON 1-11H
19252	119252	SESE 24-157-102	ANDERSON 1-24-13H
19306	119306	NWNW 28-157-102	SIIRTOLA 1-28-33H
19438	119438	SESW 21-142-97	FISHER STATE 1-21-16H-142-97

19494	119494 NENW 36-142-96	ALFRED SADOWSKY 1-36-1H-141-96
19547	119547 SWSW 21-157-100	STATE 157-100-21C-16-1H
19598	119598 NENE 26-158-99	OPSAL 158-99-26A-35-1H
19646	119646 NWNE 2-157-100	STORHAUG 157-100-2A-11-1H
19670	119670 NENE 26-157-101	MONSON TRUST 157-101-26A-35-1H
19777	119777 NWNW 13-157-101	ERIKSON 157-101-13B-24-1H
19950	119950 SESE 31-157-100	GREV 157-100-31D-30-1H
19976	219976 SWSW 20-148-94	FORT BERTHOLD 148-94-29B-32-1H
20024	120024 NWNE 16-142-95	NOVASIO STATE 1-16-21H-142-95
20063	120063 SWSW 32-157-100	STATE 157-100-32C-29-1H
20065	120065 NWNW 14-157-101	ROSSLAND 157-101-14B-23-1H
20086	220086 LOT 4 3-150-94	FORT BERTHOLD 150-94-3B-10-1H
20088	220088 LOT 4 3-150-94	FORT BERTHOLD 151-94-34C-27-1H
20092	120092 NENW 17-141-95	GORDON PAVLICEK 1-17-20H-141-95
20104	120104 NWNE 8-141-96	ELSIE DVORAK 1-8-17H-141-96
20172	220172 SESE 23-148-95	FORT BERTHOLD 148-95-23D-14-1H
20173	220173 SESE 23-148-95	FORT BERTHOLD 148-95-26A-35-1H
20218	120218 NWNE 9-141-96	STATE DVORAK 1-9-16H-141-96
20252	220252 SESE 19-148-94	FORT BERTHOLD 148-94-19D-18-1H
20253	220253 SESE 19-148-94	FORT BERTHOLD 148-94-30A-31-1H
20269	120269 SWSW 17-152-93	FORT BERTHOLD 152-93-17C-08-2H
20328	220328 NENW 26-151-94	FORT BERTHOLD 151-94-26B-35-1H
20411	120411 SWSW 21-142-94	STATE JAEGER 1-21-16H-142-94
20416	120416 SESW 6-141-96	DVORAK TRUST 1-6-31H-142-96
20425	120425 NWSW 35-142-97	STATE POLENSKY 1-35-36H-142-97
20441	120441 SESW 34-142-97	STATE MARSH 1-34-27H-142-97
20458	220458 SESW 17-152-93	FORT BERTHOLD 152-93-17C-08-3H

20534	120534 LOT4 5-157-101	POECKES 1-32-29H
20535	120535 LOT4 5-157-101	PETERSON TRUST 1-5-8H
20552	120552 SWSW 21-158-103	MULLER 1-21-16H
20553	120553 NENE 25-157-103	RASMUSSEN 1-25-36H
20567	120567 SESE 22-152-94	FORT BERTHOLD 152-94-22D-15-2H
20580	120580 NENE 15-142-95	TERRY DVORAK 1-15-22H-142-95
20614	120614 NWNW 17-157-100	WHITE 157-100-17B-20-1H
20659	120659 SWSE 17-141-97	KUDRNA 1-17
20707	120707 LOT2 1-157-103	PASTERNAK 1-1-12H
20723	120723 SWSE 32-158-99	HOKANSON 158-99-32D-29-1H
20749	120749 SWSE 32-142-97	MARLENE STEFFAN 1-5-8H-141-97
20750	120750 SWSE 12-142-95	KATIE HEISER 1-12-1H-142-95
20765	120765 SWSE 11-142-95	GEORGE MILLER 1-11-2H-142-95
20794	120794 NWNE 25-158-99	STATE 158-99-25A-36-1H
20825	120825 SESE 8-157-100	WILLIAMS AND LARSON TRUST 157-100-8D-5-1H
20844	220844 SESW 21-157-102	RASMUSSEN 1-21-16H
20866	120866 SESE 23-148-95	FORT BERTHOLD 148-95-23D-14-2H
20871	120871 SESE 9-148-94	FORT BERTHOLD 148-94-9D-04-2H
20879	120879 NENE 1-147-94	FORT BERTHOLD 147-94-1A-12-2H
20880	220880 NENE 1-147-94	FORT BERTHOLD 148-94-36D-25-2H
20918	120918 SWSW 24-148-95	FORT BERTHOLD 148-95-24C-13-1H
20919	220919 SWSW 24-148-95	FORT BERTHOLD 148-95-25B-36-1H
20953	120953 LOT2 4-157-100	JOHNSON FAMILY TRUST 157-100-4A-9-1H
20989	120989 NWNE 18-157-100	PASTERNAK TRUST 157-100-18A-19-1H
20990	120990 NENE 18-157-100	BERG 157-100-7D-6-1H
20992	120992 NENW 25-157-101	SYLTE MINERAL TRUST 157-101-25B-36-1H
21040	121040 SESE 34-158-99	HELSTAD 158-99-34D-27-1H
21066	218094 SESE 17-148-94	FORT BERTHOLD 148-94-17D-08-2H

21079	220252	SESE 19-148-94	FORT BERTHOLD 148-94-19D-18-2H
21080	220253	SESE 19-148-94	FORT BERTHOLD 148-94-30A-31-2H
21083	121083	NENW 28-158-102	DORIS 1-28-33H
21161		NESE 2-157-100	OSTAD 157-100-2D-1-1
21185	121185	SWSW 36-158-103	STATE 1-36-25H
21207	121207	NENW 14-157-101	STROMME FAMILY TRUST 157-101-11C-2-1H
21238	121238	NENW 28-158-99	HELSTAD 158-99-28B-33-1H
21293	221293	SESE 19-142-97	MAURICE HECKER 1-19-18H-142-97
21420	121420	LOT2 1-157-99	HOKANSON 157-99-1A-12-1H
21550	121550	NWNE 4-157-103	SEVEN 1-4-9H
21578	121578	SWSE 9-156-101	BERGER 156-101-9-4-1H
21606	121606	NENW 28-141-95	PRIVRATSKY 1-28-33H-141-95
21610	121610	LOT2 5-157-103	ARNSON 1-5-8H
21642	121642	SESW 20-142-97	COYOTE CREEK 1-20-17H-142-97
21652	218446	NENW 18-152-93	FORT BERTHOLD 152-93-18B-19-2H
21653	218446	NENW 18-152-93	FORT BERTHOLD 152-93-18B-19-3H
21669	121669	SESW 36-142-95	STATE JABLONSKY 1-1-12H-141-95
21674	121674	NWNE 29-142-94	FEDERAL ANNIE OAKLEY 1-20-17H-142-94
21703	121703	NENW 13-157-101	MILLER 157-101-12C-1-1H
21719	121719	LOT2 1-157-102	HOUGHT 1-1-12H
21800	221800	SESE 8-152-93	FORT BERTHOLD 152-93-9C-10-1H
21801	221800	SWSW 9-152-93	FORT BERTHOLD 152-93-9C-10-2H
21802	221800	SWSW 9-152-93	FORT BERTHOLD 152-93-9C-10-3H
21803	221800	SWSW 9-152-93	FORT BERTHOLD 152-93-9C-10-4H
21805	221800	SWSW 9-152-93	FORT BERTHOLD 152-93-9C-10-5H
21807	221800	SWSW 9-152-93	FORT BERTHOLD 152-93-9C-10-6H
21844	121844	SESW 32-142-96	KEARY KADRMAS 1-32-29H-142-96
21870	121870	NENW 6-156-101	AGRIBANK 157-101-34C-27-1H
21900	218206	NENE 2-147-94	FORT BERTHOLD 147-94-2A-11-2H
21901	218313	SESE 35-148-94	FORT BERTHOLD 148-94-35D-26-2H
21913	121913	NWNE 20-141-96	BILL CODY 1-20-29H-141-96

21939	121939	NWNE 5-157-102	PASTERNAK 1-32-29H
21940	121940	NWNE 5-157-102	PASTERNAK 1-5-8H
21963	121963	SESE 23-148-95	FORT BERTHOLD 148-95-26A-35-2H
22001	122001	NENW 4-157-102	PASTERNAK 1-4-9H
22054	122054	NENW 29-157-102	BOYDS 1-29-32H
22090	220458	SESW 17-152-93	FORT BERTHOLD 152-93-17C-08-4H
22128	122128	NENW 30-157-102	A & B 1-30-31H
22133	122133	SESE 12-142-95	MONGOOSE 1-13-24H-142-95
22150	122150	SWSE 12-141-97	RICHARD JABLONSKY 1-13-24H-141-97
22172	122172	SWSE 19-142-95	HAVELKA 1-19-18H-142-95
22234	122234	SWSE 19-142-95	STATE LITTLE MISSOURI 1-30-31H-142-95
22300		NWNE 27-148-95	FB BELFORD 148-95-22D-15-2T
22301		NWNE 27-148-95	FB BELFORD 148-95-22D-15-3B
22309	122309	SESW 31-158-102	THOME 1-6-7H
22310	122310	SESW 31-158-102	THOME 1-31-30H
22312	222312	NWNE 28-148-94	FORT BERTHOLD 148-94-28A-33-1H
22313	222312	NWNE 28-148-94	FORT BERTHOLD 148-94-28A-33-2H
22351	122351	NWNE 28-142-97	LOUIE PAVLICEK 1-28-33H-142-97
22352	122352	NWNE 28-142-97	STATE FISHER 2-21-16H-142-97
22369	122369	SESW 36-142-95	STATE JABLONSKY B 1-36-25H-142-95
22441	122441	SWSW 34-142-96	BINSTOCK 1-34-27H-142-96
22444	122444	SWSE 35-142-95	EASTON 1-35-26H-142-95
22445	122445	SWSW 33-142-96	HATTIE DVORAK 1-33-28H-142-96
22447	122447	NENW 26-157-102	J. RASMUSSEN 1-26-35H
22448	122448	NENW 26-157-102	C. RASMUSSEN 1-23-14H
22456	122456	LOT2 1-157-100	HOFF 157-100-1A-12-1H
22469	122469	SESW 31-158-101	HOUGHT 1-6-7H
22470	122470	SESW 31-158-101	HOUGHT 1-31-30H
22495	222495	LOT3 1-156-101	BORRUD 156-101-1-12-1H
22503	220919	SWSW 24-148-95	FORT BERTHOLD 148-95-25B-36-2H
22506	222506	SESW 22-157-101	ROSSLAND 157-101-22C-15-1H

22518	122518 NWNE 27-157-102	QUARNE 1-27-34H
22545	122545 SWSE 9-158-102	J HAUGEN 1-9-4H
22560	222560 SENE 21-148-94	FORT BERTHOLD 148-94-21A-20-1H
22561	222560 SENE 21-148-94	FORT BERTHOLD 148-94-21A-20-2H
22562	222560 SENE 21-148-94	FORT BERTHOLD 148-94-21A-20-3H
22589	122589 LOT3 3-157-101	KING 157-101-3B-10-1H
22672	122672 NWNE 18-158-101	PEDERSON 1-18-19H
22707	220328 NWNW 26-151-94	FORT BERTHOLD 151-94-26B-35-3H
22708	220328 NWNW 26-151-94	FORT BERTHOLD 151-94-26B-35-2H
22822	122822 SWSE 20-157-101	BERG 1-29-32H
22823	122823 SWSE 20-157-101	BERG 1-20-17H
22826	122826 LOT1 2-157-99	HELSTAD 157-99-2A-11-1H
22878	122878 NENW 22-148-94	FORT BERTHOLD 148-94-22B-27-5H
22881	122881 NWNE 29-142-94	STATE FRANK BUTLER 1-29-32H-142-94
22979	222979 SESW 9-148-94	FORT BERTHOLD 148-94-9C-04-5H
22980	222979 SESW 9-148-94	FORT BERTHOLD 148-94-9C-04-4H
22981	222979 SESW 9-148-94	FORT BERTHOLD 148-94-9C-04-3H
22983	219976 SWSW 20-148-94	FORT BERTHOLD 148-94-29B-32-2H
22984	122984 SWSE 20-142-95	SCHAFNER 1-29-32H-142-95
22985	122985 SWSE 20-142-95	STATE LITTLE KNIFE 1-20-17H-142-95
23088	123088 SESW 23-142-98	KUNTZ 1-23-14H-142-98
23120	123120 NWNE 27-157-102	HOUGHT F.T. 1-22-15H
23123	123123 SWSE 19-148-94	FORT BERTHOLD 148-94-19D-18-3H
23124	123124 SWSE 19-148-94	FORT BERTHOLD 148-94-30A-31-3H
23223	223223 NENE 22-148-94	FORT BERTHOLD 148-94-22A-27-2H
23252	123252 SWSE 34-158-102	ANDRE 1-34-27H
23253	123253 SWSE 34-158-102	PASTERNAK 1-3-10H

23258	123258	SESE 34-148-94	FORT BERTHOLD 147-94-3A-10-2H
23353	123353	NENW 27-142-95	FRANK ANDERS 1-27-34H-142-95
23382	123382	NWNW 1-147-94	FORT BERTHOLD 147-94-1B-12-3H
23383	123383	NWNW 1-147-94	FORT BERTHOLD 148-94-36C-25-3H
23384	123384	SESW 13-141-96	JOSEPH CARTER 1-13-12H-141-96
23505	223507	SESE 17-152-93	FORT BERTHOLD 152-93-17D-08-7H
23506	223507	SESE 17-152-93	FORT BERTHOLD 152-93-17D-08-6H
23507	223507	SESE 17-152-93	FORT BERTHOLD 152-93-17D-08-5H
23550	218426	SWSW 14-152-94	FORT BERTHOLD 152-94-14C-11-2H
23554	223554	SESE 14-152-94	FORT BERTHOLD 152-94-14D-11-4H
23555		SESE 14-152-94	FORT BERTHOLD 152-94-14D-11-3H
23596	223596	LOT 3 2-157-102	PASTERNAK FEDERAL 1-2-11H
23597	123597	NENW 30-157-101	BERG 1-30-31H
23621	123621	NENW 30-157-101	BERG 1-19-18H
23676	123676	NWNE 4-142-94	CHARLES DAVIS 1-4-9H-142-94
23685	123685	SESW 7-142-94	MEDUNA TRUST 1-7-6H-142-94
23706	123706	LOT3 2-157-102	MILLER 1-35-26H
23722	123722	LOT3 1-157-102	HOUGHT 2-1-12H
23723	123723	LOT3 1-157-102	H STATE 1-36-25H
23844	123844	SWSW 36-141-97	NELS WOLD 1-36-25H-141-97
23845	123845	NENW 24-142-96	RIDL 1-24-25H-142-96
23928	123928	SESE 30-141-96	HENRY GURKE 1-30-19H-141-96
23932	123932	SWSE 35-141-97	LOREN HAGEN 1-35-26H-141-97
24108	124108	NWNE 14-157-103	G LARSEN 1-14-23H
24150	224150	SWSW 27-148-94	FORT BERTHOLD 148-94-27C-22-3H
24210	124210	SWSW 21-141-96	WOODROW KEEBLE 1-21-22H-141-96
24220	124220	NENW 26-149-98	BERG TRUST FEDERAL 1-26-35H
24231	124231	NWNE 13-158-102	GLIMM 1-13-24H
24248		NENW 14-158-102	OYEN 1-11-2H
24249	124249	NENW 14-158-102	POECKES 1-14-23H

25207	225207	NENW 27-148-95	FORT BERTHOLD 148-95-27B-34-4H
25208	225208	NENW 27-148-95	FORT BERTHOLD 148-95-22C-15-4H
25209	225207	SESW 22-148-95	FORT BERTHOLD 148-95-27B-34-5H
25210	225208	SESW 22-148-95	FORT BERTHOLD 148-95-22C-15-5H
25370	218905	NWNW 13-152-94	FORT BERTHOLD 152-94-13B-24-2H
25399	225399	NENE 13-152-94	FORT BERTHOLD 152-94-13A-24-4H
25400	225399	NENE 13-152-94	FORT BERTHOLD 152-94-13A-24-3H
25443		NWNW 25-157-102	ANN H. THOME 3-25-36H
25444		NWNW 25-157-102	ANN H. THOME 4-25-36H
25445		NENW 25-157-102	ANN H. THOME 5-25-36H
25494	224731	NWNW 15-152-94	FORT BERTHOLD 152-94-15B-22-4H
25499	125499	SWSE 20-157-100	MOLINE 157-100-20D-17-2H
25502	224417	SESW 17-148-94	FORT BERTHOLD 148-94-17C-8-5H
25524	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-5H
25525	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-6H
25526	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-7H
25534	125534	SWSW 33-148-94	FORT BERTHOLD 148-94-33C-28-3H
25556		NWNE 29-148-94	FORT BERTHOLD 148-94-29A-32-8TFH
25557		NWNE 29-148-94	FORT BERTHOLD 148-94-29A-32-9TFH
25570	222226	SESE 24-157-102	JOHNSON 7-25-36H
25596	225597	SESW 35-148-94	FORT BERTHOLD 147-94-2B-11-5H
25597	225597	SESW 35-148-94	FORT BERTHOLD 147-94-2B-11-4H
25598	225597	SESW 35-148-94	FORT BERTHOLD 147-94-2B-11-3H
25793	219103	NWNW 28-157-100	NJOS 157-100-28B-33-2H

25800		NENW 3-147-94	FORT BERTHOLD 147-94-3B-10-8TFH
25801	224270	NENW 3-147-94	FORT BERTHOLD 147-94-3B-10-7H
25988	225988	SWSW 20-148-94	FORT BERTHOLD 148-94-20C-21-5H
25989	225988	SWSW 20-148-94	FORT BERTHOLD 148-94-20C-21-4H
25992	223596	LOT1 2-157-102	PASTERNAK FEDERAL 2-2-11H
26084	220844	SWSE 21-157-102	QUARNE 2-21-16H

File No	CTB No	Location	Well Name
26116	126116	SESW 19-157-100	GREV 157-100-30B-31-3H
26117		LOT4 19-157-100	PASTERNAK TRUST 157-100-19C-18-3H
26118	126118	LOT4 19-157-100	GREV 157-100-30B-31-2H
26119	126119	LOT4 19-157-100	PASTERNAK TRUST 157-100-19C-18-2H
26209		SESE 31-158-102	CHRISTINE JOE 2-31-30H
26210	126210	SWSE 20-157-100	STATE 157-100-29A-32-3H
26211	126211	SWSE 20-157-100	MOLINE 157-100-20D-17-3H
26279	226279	SESW 36-148-94	FORT BERTHOLD 148-94-36C-25-4H
26280	226280	SESW 36-148-94	FORT BERTHOLD 147-94-1B-12-4H
26281	226279	SESW 36-148-94	FORT BERTHOLD 148-94-36C-25-5H
26282	226280	SESW 36-148-94	FORT BERTHOLD 147-94-1B-12-5H
26293	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-5H
26294	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-4H
26295	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-3H
26322	225207	NENW 27-148-95	FORT BERTHOLD 148-95-27B-34-8H
26323	225208	NENW 27-148-95	FORT BERTHOLD 148-95-22C-15-9H
26341	226341	SESE 12-157-101	MILLER 157-101-12D-1-3H
26342	226341	SESE 12-157-101	MILLER 157-101-12D-1-2H
26366	126366	SESW 32-142-96	KEARY KADRMAS 2-32-29H-142-96
26414		NENE 25-157-101	BERG 157-101-24D-13-2H
26415		NENE 25-157-101	WM POLAR 157-101-25A-36-2B
26417		NENE 25-157-101	WM POLAR 157-101-25A-36-4B
26671		NENW 3-147-94	FORT BERTHOLD 147-94-3B-10-9TFH
26796	226796	SWSE 24-152-94	FORT BERTHOLD 152-94-24D-13-7H
26797	226796	SWSE 24-152-94	FORT BERTHOLD 152-94-24D-13-6H
26798	226796	SWSE 24-152-94	FORT BERTHOLD 152-94-24D-13-5H
26815	226815	LOT4 3-157-99	WM HELSTAD 158-99-34C-27-2B
26816	226815	LOT4 3-157-99	WM JOHNSON 157-99-3B-10-2B
26817	226815	LOT3 3-157-99	WM HELSTAD 158-99-34C-27-3B
26818	226815	LOT4 3-157-99	WM JOHNSON 157-99-3B-10-3B
26824		NENE 25-157-101	WM POLAR 157-101-25B-36-6B
26865	226865	SWSW 33-148-94	FORT BERTHOLD 148-94-33C-28-8H
26866	226865	SWSW 33-148-94	FORT BERTHOLD 148-94-33C-28-9H
26867	226865	SWSW 33-148-94	FORT BERTHOLD 148-94-33C-28-10H

26906	226906	SESW 19-152-93	FORT BERTHOLD 152-93-19D-18-7H
26907	226906	SESW 19-152-93	FORT BERTHOLD 152-93-19D-18-6H
26913		SESE 19-152-93	FORT BERTHOLD 152-93-19D-18-5H
26914	226906	SESE 19-152-93	FORT BERTHOLD 152-93-19D-18-4H
26917		SWSE 24-157-103	JANE NELSON 34-24H
27000	219038	NWNE 25-157-100	NELSON 157-100-25A-36-2H
27001	219038	NWNE 25-157-100	NELSON 157-100-25A-36-3H
27002	219038	NWNE 25-157-100	NELSON 157-100-25A-36-4H
27045	225988	SWSW 20-148-94	FORT BERTHOLD 148-94-20C-21-6H
27102		SWSW 27-148-94	FORT BERTHOLD 148-94-27C-22-9H
27103	224150	SWSW 27-148-94	FORT BERTHOLD 148-94-27C-22-8H
27105	224150	SWSW 27-148-94	FORT BERTHOLD 148-94-27C-22-7H
27106	224150	SWSW 27-148-94	FORT BERTHOLD 148-94-27C-22-6H
27107	224150	SWSW 27-148-94	FORT BERTHOLD 148-94-27C-22-4H
27125	220172	SESE 23-148-95	FORT BERTHOLD 148-95-23D-14-6H
27126	220173	SESE 23-148-95	FORT BERTHOLD 148-95-26A-35-10H
27127	220172	SESE 23-148-95	FORT BERTHOLD 148-95-23D-14-7H
27277	227277	SESW 19-148-94	FORT BERTHOLD 148-94-19C-18-4H
27278	227278	SESW 19-148-94	FORT BERTHOLD 148-94-30B-31-4H
27279	227277	SESW 19-148-94	FORT BERTHOLD 148-94-19C-18-5H
27280	227278	SESW 19-148-94	FORT BERTHOLD 148-94-30B-31-5H
27412	220919	SESW 24-148-95	FORT BERTHOLD 148-95-25B-36-7H
27414	220919	SWSW 24-148-95	FORT BERTHOLD 148-95-25B-36-6H
27415	220919	SWSW 24-148-95	FORT BERTHOLD 148-95-25B-36-5H
27416	220919	SWSW 24-148-95	FORT BERTHOLD 148-95-25B-36-4H
27417	220919	SWSW 24-148-95	FORT BERTHOLD 148-95-25B-36-3H
27431	227431	NENW 26-148-95	FORT BERTHOLD 148-95-23C-14-3H
27432	227431	NENW 26-148-95	FORT BERTHOLD 148-95-23C-14-8H
27433	227431	NENW 26-148-95	FORT BERTHOLD 148-95-23C-14-4H
27434	227431	NENW 26-148-95	FORT BERTHOLD 148-95-23C-14-9H
27435	227431	NENW 26-148-95	FORT BERTHOLD 148-95-23C-14-5H
27456	227456	NENW 26-148-95	FORT BERTHOLD 148-95-26B-35-3H
27457	227456	NENW 26-148-95	FORT BERTHOLD 148-95-26B-35-9H
27458	227456	NENW 26-148-95	FORT BERTHOLD 148-95-26B-35-4H
27459	227456	NENW 26-148-95	FORT BERTHOLD 148-95-26B-35-8H
27460	227456	NENW 26-148-95	FORT BERTHOLD 148-95-26B-35-5H

27543	127543	SESW 22-142-98	JOHN KINNE 2-27-34H-142-98
27646	220173	SESE 23-148-95	FORT BERTHOLD 148-95-26A-35-14H
27888	221293	SESE 19-142-97	MAURICE HECKER 2-19-18H-142-97
28280	224417	SESW 17-148-94	FORT BERTHOLD 148-94-17C-8-6H
28281	224417	SESW 17-148-94	FORT BERTHOLD 148-94-17C-8-7H
28296	226906	SESE 19-152-93	FORT BERTHOLD 152-93-19D-18-10H
28297	228297	SESE 19-152-93	FORT BERTHOLD 152-93-19D-18-11H
28298	228297	SESE 19-152-93	FORT BERTHOLD 152-93-19D-18-14H
28628	222312	NWNE 28-148-94	FORT BERTHOLD 148-94-28A-33-13H
28629	128629	NWNE 28-148-94	FORT BERTHOLD 148-94-28A-33-12H
29134	226279	SESW 36-148-94	FORT BERTHOLD 148-94-36C-25-6H
29135	226280	SESW 36-148-94	FORT BERTHOLD 147-94-1B-12-6H
29136	226280	SESW 36-148-94	FORT BERTHOLD 147-94-1B-12-7H
29238	225562	LOT3 2-156-101	BORRUD 156-101-2B-11-3H
29239	225562	LOT3 2-156-101	BORRUD 156-101-2B-11-4H
29240	225562	LOT3 2-156-101	BORRUD 156-101-2B-11-5H
29538		LOT3 1-156-101	BORRUD 156-101-1B-12-3H-P
29539	222495	LOT3 1-156-101	BORRUD 156-101-1B-12-2H
29571	224338	SESE 33-148-94	FORT BERTHOLD 148-94-33D-28-6H
29572	129572	SESE 33-148-94	FORT BERTHOLD 148-94-33D-28-7H
29787	222495	LOT3 1-156-101	BORRUD 156-101-1A-12-1TFH
29847	218458	NENE 3-147-94	FORT BERTHOLD 147-94-3A-10-6H
29848	218458	NENE 3-147-94	FORT BERTHOLD 147-94-3A-10-10H
29849	129849	NENE 3-147-94	FORT BERTHOLD 147-94-3A-10-12H
30241	230241	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-13H
30242	230241	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-12H
30243	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-11H
30244	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-10H
30245	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-9H
30246	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-8H
30247	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-7H
30248	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-6H
30268	218094	SESE 17-148-94	FORT BERTHOLD 148-94-17D-8-12H
30269	130269	SESE 17-148-94	FORT BERTHOLD 148-94-17D-8-13H
30541	230541	NENE 26-151-94	FORT BERTHOLD 151-94-26A-35-4H
30542	230541	NENE 26-151-94	FORT BERTHOLD 151-94-26A-35-5H
30543	230541	NENE 26-151-94	FORT BERTHOLD 151-94-26A-35-6H
30544	230541	NENE 26-151-94	FORT BERTHOLD 151-94-26A-35-7H
30545	230541	NENE 26-151-94	FORT BERTHOLD 151-94-26A-35-8H
30546	230541	NENE 26-151-94	FORT BERTHOLD 151-94-26A-35-9H

30555	230555	NWNW 13-148-95	FORT BERTHOLD 148-95-13B-24-2H
30556	230555	NWNW 13-148-95	FORT BERTHOLD 148-95-13B-24-10H
30558	230555	NENW 13-148-95	FORT BERTHOLD 148-95-13B-24-12H
30559	230555	NENW 13-148-95	FORT BERTHOLD 148-95-13B-24-13H
30564	227431	NENW 26-148-95	FORT BERTHOLD 148-95-23C-14-10H
30679	218341	NWNE 1-147-94	FORT BERTHOLD 147-94-1A-12-10H
30680	218341	NWNE 1-147-94	FORT BERTHOLD 147-94-1A-12-9H
30726	230726	NENE 26-149-98	BERG TRUST FEDERAL 149-98-26A-35-6H
30727	230726	NENE 26-149-98	BERG TRUST FEDERAL 149-98-26A-35-7H
30728	230726	NENE 26-149-98	BERG TRUST FEDERAL 149-98-26A-35-9H
30729	130729	NENE 26-149-98	BERG TRUST FEDERAL 149-98-26A-35-10H
30783	226906	SWSE 19-152-93	FORT BERTHOLD 152-93-19D-18-12H
30784	226906	SWSE 19-152-93	FORT BERTHOLD 152-93-19D-18-8H
30785	226906	SWSE 19-152-93	FORT BERTHOLD 152-93-19D-18-9H
31076	225597	SESW 35-148-94	FORT BERTHOLD 147-94-2B-11-6H
31077	225597	SESW 35-148-94	FORT BERTHOLD 147-94-2B-11-7H
31078	225597	SESW 35-148-94	FORT BERTHOLD 147-94-2B-11-8H
31080	225597	SESW 35-148-94	FORT BERTHOLD 147-94-2B-11-9H
31081	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-10H
31082	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-7H
31083	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-9H
31084	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-8H
31085	226293	SESW 35-148-94	FORT BERTHOLD 148-94-35C-26-6H
31154	224297	NWNE 13-148-95	FORT BERTHOLD 148-95-13A-24-6H
31155	231155	NWNE 13-148-95	FORT BERTHOLD 148-95-13A-24-7H
31156	231155	NWNE 13-148-95	FORT BERTHOLD 148-95-13A-24-8H
31161	223223	NENE 22-148-94	FORT BERTHOLD 148-94-22A-27-11H
31188	220919	SESW 24-148-95	FORT BERTHOLD 148-95-25B-36-8H
31454	231454	LOT3 3-150-94	FB JAMES 150-94-3A-10-10T
31455	231454	LOT3 3-150-94	FB JAMES 150-94-3B-10-11B
31456	231454	LOT3 3-150-94	FB JAMES 150-94-3B-10-12T
31457	231454	LOT3 3-150-94	FB JAMES 150-94-3B-10-13B
31458	231454	LOT3 3-150-94	FB JAMES 150-94-3A-10-6B
31462	226279	SESW 36-148-94	FORT BERTHOLD 148-94-36C-25-7H

31464	226279	SESW 36-148-94	FORT BERTHOLD 148-94-36C-25-8H
31697	131697	NENE 22-148-94	FORT BERTHOLD 148-94-22A-27-12H
31774	231774	NWNW 26-151-94	FORT BERTHOLD 151-94-27A-34-16H
31775	231774	NWNW 26-151-94	FORT BERTHOLD 151-94-26B-35-15H
31776	231776	NWNW 26-151-94	FORT BERTHOLD 151-94-26B-35-12H
31777	231776	NWNW 26-151-94	FORT BERTHOLD 151-94-26B-35-11H
31778	231776	NWNW 26-151-94	FORT BERTHOLD 151-94-26B-35-10H
31889	231889	SESE 22-152-94	FORT BERTHOLD 152-94-22D-15-10H
31890	231889	SESE 22-152-94	FORT BERTHOLD 152-94-22D-15-11H
31994	231994	NENE 13-152-94	FORT BERTHOLD 152-94-13A-24-15H
31995	231994	NENE 13-152-94	FORT BERTHOLD 152-94-13A-24-16H
32156	218905	NENW 13-152-94	FORT BERTHOLD 152-94-13B-24-12H
32157	218905	NENW 13-152-94	FORT BERTHOLD 152-94-13B-24-11H
32158	218905	NWNW 13-152-94	FORT BERTHOLD 152-94-13B-24-13H
32232	224737	NWNE 15-152-94	FORT BERTHOLD 152-94-15A-22-9H
32233	224737	NENW 15-152-94	FORT BERTHOLD 152-94-15B-22-8H
32409		SESE 9-148-94	FORT BERTHOLD 148-94-9D-4-7H
32410		SESE 9-148-94	FORT BERTHOLD 148-94-9D-4-6H
32411		SESE 9-148-94	FORT BERTHOLD 148-94-9D-4-12H
32431	231776	NWNW 26-151-94	FORT BERTHOLD 151-94-26B-35-13H
32503	232503	NENE 1-147-94	FORT BERTHOLD 147-94-1A-12-11H
32504	220880	NENE 1-147-94	FORT BERTHOLD 148-94-36D-25-11H
32505	232503	NENE 1-147-94	FORT BERTHOLD 147-94-1A-12-12H
32506	132506	NENE 1-147-94	FORT BERTHOLD 148-94-36D-25-10H
32579	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-5H
32580	230243	SESW 7-152-93	FORT BERTHOLD 152-93-7C-6-14H
32608	232608	SESE 35-148-94	FORT BERTHOLD 148-94-35D-26-11H
32609		SESE 35-148-94	FORT BERTHOLD 147-94-2A-11-13H-V
32610		SESE 35-148-94	FORT BERTHOLD 147-94-2A-11-12H-V
32611	218313	SESE 35-148-94	FORT BERTHOLD 148-94-35D-26-12H
32612	218313	SESE 35-148-94	FORT BERTHOLD 148-94-35D-26-13H
32613		SESE 35-148-94	FORT BERTHOLD 147-94-2A-11-11H-V
33124	226280	SESW 36-148-94	FORT BERTHOLD 147-94-1B-12-13H

33125	226280	SESW 36-148-94	FORT BERTHOLD 147-94-1B-12-8H
33335	222495	LOT3 1-156-101	BORRUD 156-101-1A-12-4H
33336	222495	LOT3 1-156-101	BORRUD 156-101-1A-12-5H
33594	230555	NWNW 13-148-95	FORT BERTHOLD 148-95-13B-24-9H
34254	134254	SESE 14-141-96	SADOWSKY 14-11-2H
34528	222312	NWNE 28-148-94	FORT BERTHOLD 148-94-28A-33-14H
34529	222312	NWNE 28-148-94	FORT BERTHOLD 148-94-28A-33-15H
34532	230726	NENE 26-149-98	BERG TRUST FEDERAL 149-98-26A-35-8H
34887	218206	SWSE 35-148-94	FORT BERTHOLD 147-94-2A-11-11H
34888	218206	SWSE 35-148-94	FORT BERTHOLD 147-94-2A-11-12H
34889	134889	SWSE 35-148-94	FORT BERTHOLD 147-94-2A-11-13H
34890	232608	SWSE 35-148-94	FORT BERTHOLD 148-94-35D-26-14H
34961	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-8H
34962	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-9H
34963	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-10H
34964	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-11H
34965	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-12H
34966	225524	SESW 2-152-94	FORT BERTHOLD 152-94-11B-14-18H
35487		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-10T
35488		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-11B
35489		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-14T2
35490		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-13B
35491		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-15T
35492		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-16B
35493		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-19T2
35508		NENW 29-148-94	FB CLINTON 148-94-29B-32-6T
35509		NENW 29-148-94	FB CLINTON 148-94-29B-32-7B
35510		NENW 29-148-94	FB CLINTON 148-94-29B-32-8T
35511		NENW 29-148-94	FB CLINTON 148-94-29B-32-9B
35512		NENW 29-148-94	FB CLINTON 148-94-29B-32-10B
35513		NENW 29-148-94	FB CLINTON 148-94-29B-32-11T
35539	223554	SESE 14-152-94	FORT BERTHOLD 152-94-14D-11-19H
35540	223554	SESE 14-152-94	FORT BERTHOLD 152-94-14D-11-16H
35541	235541	SESE 14-152-94	FORT BERTHOLD 152-94-14D-2-15H3
35542	235541	SESE 14-152-94	FORT BERTHOLD 152-94-14D-2-13H3
35716		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-12T
35717		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-17T
35718		NENE 27-151-94	FB LEVIATHAN 151-94-27A-34-18B

35806	222495	LOT3 1-156-101	BORRUD 157-100-33C-21-1H3
35962	231454	LOT3 3-150-94	FB JAMES 150-94-3A-10-7T
35963	231454	LOT3 3-150-94	FB JAMES 150-94-3A-10-8T2
35964	231454	LOT3 3-150-94	FB JAMES 150-94-3A-10-9B
35983	226815	LOT4 3-157-99	WM JOHNSON 157-99-3B-10-4B
35984	226815	LOT3 3-157-99	WM HELSTAD 158-99-34C-27-4B
36127	222495	LOT3 1-156-101	BORRUD 156-101-1B-12-3H
36192	226815	LOT4 3-157-99	WM JOHNSON 157-99-3B-10-1T
36302		NENE 27-148-95	FB BELFORD 148-95-22D-15-14B-LL
36303		NENE 27-148-95	FB BELFORD 148-95-22D-15-13T-LL
36304		NWNE 27-148-95	FB BELFORD 148-95-22D-15-10B
36305		NWNE 27-148-95	FB BELFORD 148-95-22D-15-8T
36306		NWNE 27-148-95	FB BELFORD 148-95-22D-15-7B
36307		NWNE 27-148-95	FB BELFORD 148-95-22D-15-6T
36653	221800	LOT8 8-152-93	FB BONITA 152-93-9B-10-9T
36654	221800	LOT8 8-152-93	FB BONITA 152-93-9B-10-10B
36655	221800	LOT8 8-152-93	FB BONITA 152-93-9B-10-12T
36656	221800	LOT8 8-152-93	FB BONITA 152-93-9B-10-13B
36657	221800	LOT8 8-152-93	FB BONITA 152-93-9B-10-14T
36658	221800	LOT8 8-152-93	FB BONITA 152-93-9B-10-15B
36710		LOT4 19-148-94	FORT BERTHOLD 148-95-25A-36-12H
36711		LOT4 19-148-94	FORT BERTHOLD 148-95-25A-36-10H
36712		SESW 19-148-94	FORT BERTHOLD 148-95-25A-36-9H
36713		LOT4 19-148-94	FORT BERTHOLD 148-94-30B-31-14H
36714		SESW 19-148-94	FORT BERTHOLD 148-94-30B-31-13H
36715		SESW 19-148-94	FORT BERTHOLD 148-94-30B-31-11H
36716		SESW 19-148-94	FORT BERTHOLD 148-94-30B-31-6H
36717		LOT4 19-148-94	FORT BERTHOLD 148-94-19C-18-8H
36718		LOT4 19-148-94	FORT BERTHOLD 148-94-19C-18-7H
36719		LOT4 19-148-94	FORT BERTHOLD 148-94-19C-18-6H
37117		LOT4 1-157-99	WM BROWN 157-99-1B-12-2B-LL
37118		LOT4 1-157-99	WM Brown 157-99-2A-11-3T
37119		LOT4 1-157-99	WM BROWN 157-99-1B-12-4B
37120		LOT4 1-157-99	WM BROWN 157-99-1B-12-5T
37121		LOT4 1-157-99	WM BROWN 157-99-1B-12-6B
37122		LOT4 1-157-99	WM BROWN 158-99-35D-26-3B-LL
37123		LOT4 1-157-99	WM BROWN 158-99-36C-25-5B
37124		LOT4 1-157-99	WM BROWN 158-99-36C-25-4T
37125		LOT4 1-157-99	WM BROWN 158-99-36C-25-7B
37126		LOT4 1-157-99	WM BROWN 158-99-36C-25-6T

37127	LOT4 1-157-99	WM BROWN 158-99-36D-25-9B
37233	NENE 25-157-101	WM POLAR 157-101-24D-13-3B
37234	NENE 25-157-101	WM POLAR 157-101-24D-13-5B
37235	NENE 25-157-101	WM POLAR 157-101-24C-13-7B
37464	NWNW 25-157-102	WM Ann Thome 157-102-24C-13-2B
90154	SESE 1-157-100	WM MARMON SWD 157-100-1D-2
90155	NESE 1-157-100	WM MARMON SWD 157-100-1D-1
90211	SWSW 1-157-103	MANGER 1 SWD
90227	NWNW 28-157-102	SIIRTOLA 1 SWD

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

RECEIVED
JAN 3 1 2018
ND OIL & GAS DIVISION

Well File No.
20552
NDIC CTB No.
120552

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
MULLER 1-21-16H	SWSW	21	158 N	103 W	WILLIAMS

Operator	Telephone Number	Field
BRUIN E & P OPERATING, LLC	713-456-3000	CLIMAX

Address	City	State	Zip Code
602 SAWYER ST, SUITE 710	HOUSTON	TX	77007-7510

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
CONCORD ENERGY LLC	(303) 468-1900	100	February 1, 2018

Principal Place of Business	City	State	Zip Code
1401 17TH STR SUITE 1500	DENVER	CO	80202 ~~80016~~

Field Address	City	State	Zip Code
3804 17TH AVE NE	WATFORD CITY	ND	58854

Name of Transporter	Telephone Number	% Transported	Date Effective
CONCORD ENERGY TRANSPORTATION LLC	(701) 842-2580	100	February 1, 2018

Address	City	State	Zip Code
3804 17TH AVE NE	WATFORD CITY	ND	58854

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.		Date
Signature	Printed Name	Title
	JANET DASSINGER	LEAD PRODUCTION ANALYST

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
JK	JAMIE KROGH	PRODUCTION ANALYST

FOR STATE USE ONLY

Date Approved	FEB 06 2018
By	
Title	

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

RECEIVED
NOV 17 2017
ND OIL & GAS DIVISION

Well File No.
20552
NDIC CTB No.
120552

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
MULLER 1-21-16H	SWSW	21	158 N	103 W	WILLIAMS

Operator	Telephone Number	Field
BRUIN E & P OPERATING, LLC	713-456-3000	CLIMAX

Address	City	State	Zip Code
602 SAWYER ST, SUITE 710	HOUSTON	TX	77007-7510

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
PLAINS MARKETING, L.P.	(713) 646-4100	100	November 21, 2017

Principal Place of Business	City	State	Zip Code
P.O. BOX 4648	HOUSTON	TX	77210
Field Address	**City**	**State**	**Zip Code**
303 6TH AVE NE	BELFIELD	ND	58622

Name of Transporter	Telephone Number	% Transported	Date Effective
PLAINS MARKETING, L.P.	(701) 575-4349	100	November 21, 2017

Address	City	State	Zip Code
303 6TH AVE NE	BELFIELD	ND	58622

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. Date: November 16, 2017

Signature	Printed Name	Title
Janet Dassinger	JANET DASSINGER	LEAD PRODUCTION ANALYST

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
Jamie Krogh	JAMIE KROGH	PRODUCTION ANALYST

FOR STATE USE ONLY

Date Approved	JAN 24 2018
By	
Title	

NORTH DAKOTA
OIL AND GAS DIVISION

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director
Department of Mineral Resources
Lynn D. Helms - Director
North Dakota Industrial Commission
www.dmr.nd.gov/oilgas/

January 23, 2018

Bruin E&P Operating, LLC
602 Sawyer Street, Ste 710
Houston, TX 77007

RE: CHANGE OF OPERATOR FROM HRC OPERATING, LLC TO BRUIN E&P OPERATING, LLC.
404 Wells

Dear S. Tyler Crabtree,

Please find enclosed a copy of the approved Form 15, Notice of Transfer of Oil and Gas Wells, in regard to the above-referenced matter. This transfer has now been approved and subject well is now covered by Bond No. B010221.

If you should have any questions, please feel free to contact this office.

Sincerely,

Rachel Morris
Administrative Assistant

Enclosure:

600 E Boulevard Ave - Dept 405, Bismarck, North Dakota 58505-0840 Phone (701)328-8020 Fax (701)328-8022

NOTICE OF TRANSFER OF OIL AND GAS WELLS - FORM 15

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5762 (03-2000)

RECEIVED SEP 1 8 2017 ND OIL & GAS DIVISION

RECEIVED JAN 2 2 2018 ND OIL & GAS DIVISION

FOR STATE USE ONLY
NDIC Bond Number B377

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM. PLEASE SUBMIT THE ORIGINAL AND SIX COPIES.
THIS NOTICE ALONG WITH A FEE OF $25.00 PER WELL SHALL BE FILED AT LEAST THIRTY DAYS BEFORE THE CLOSING DATE OF TRANSFER.

TRANSFERRING OPERATOR

Name of Operator Representative **Stephen W. Herod**			
Operator Transferring Oil and/or Gas Wells **HRC Operating, LLC**			Telephone Number **303-297-2028**
Address **1801 California Street, Suite 3500**	City **Denver**	State **CO**	Zip Code **80202**
I, the above named representative, acknowledge the transfer of the oil and/or gas wells named below for the purpose of ownership and/or operation to the company named below.			
Signature	Title (Must be an officer or power of attorney must be attached) **EVP, Corporate Development**		Date

Well File Number	Requested Official Well Name and Number	Location (Qtr-Qtr, S-T-R)	Assignment Date
	See Attached Exhibit		**June 1, 2017**

RECEIVING OPERATOR

Name of Operator Representative **S. Tyler Crabtree**			
Operator Receiving Oil and/or Gas Wells **Bruin E&P Operating, LLC**			Telephone Number **713-456-3000**
Address **602 Sawyer Street, Suite 710**	City **Houston**	State **TX**	Zip Code **77007**
I, the above named representative, have read the foregoing statement and accept such transfer, also the responsibility of ownership and/or operation of said well or wells, under the said company bond, said bond being tendered to or on file with the Industrial Commission of North Dakota.			
Signature	Title (Must be an officer or power of attorney must be attached) **CFO**		Date 9/7/17

SURETY COMPANY

Surety **U.S. Specialty Insurance Company**			Telephone Number **713-355-3100**	Amount of Bond **$ 100,000**
Address **13403 Northwest Freeway**	City **Houston**	State **TX**	Zip Code **77040**	Bond Number **B010221**
The above named SURETY agrees that such bond shall extend to compliance with Chapter 38-08 of North Dakota Century Code and amendments and the rules and regulations of the Industrial Commission of North Dakota prescribed to govern the production of oil and gas on government and private lands within the State of North Dakota, in relation to the above stated transfer; it being further agreed and understood that the bond sum or amount is not to be considered increased because of such extension.				
Signature Michele K. Tyson	Title (Must be an officer or power of attorney must be attached) **Attorney-in-Fact**			Date January 19, 2018
Printed Name Michele K. Tyson				

FOR STATE USE ONLY

Date Approved	January 23, 2018
By	Bruce E. Hicks
Title	Assistant Director

File No	API No	Location	Operator	Well Name	Field
1871	3300900275	NENE 31-163-78	HRC OPERATING, LLC	H. AND H. NORDMARK 1	ROTH
~~2743~~	3300900843	NESW 25-162-82	HRC OPERATING, LLC	W AND M PETERSON 1	SHERMAN
~~6644~~	3300901291	SENE 31-162-81	HRC OPERATING, LLC	OSCAR FOSSUM 1	WAYNE
~~6787~~	3300901317	NWNE 31-162-81	HRC OPERATING, LLC	OSCAR FOSSUM 3	WAYNE
~~15104~~	3300902052	SENE 10-163-77	HRC OPERATING, LLC	KORNKVEN 8-10H	WILDCAT
16282	3300902115	SWSE 18-161-78	HRC OPERATING, LLC	V&F JOHNSON-FCB 1-18	STARBUCK
17569	3300902141	SWNW 3-163-78	HRC OPERATING, LLC	KJELSHUS 5-3	SOURIS
~~17618~~	3300902144	SWNW 2-160-79	HRC OPERATING, LLC	SMU 5-2 I	STARBUCK
18094	3302500930	SESE 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17D-08-1H	EAGLE NEST
18126	3305303024	SESW 17-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-17C-08-1H	FOUR BEARS
18206	3302500947	NWNE 2-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2A-11-1H	MCGREGORY BUTTES
18313	3302500970	SWSE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35D-26-1H	MCGREGORY BUTTES
18332	3302500973	NWNE 25-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-25A-36-1H	MCGREGORY BUTTES
18335	3302500975	NWNE 22-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-22A-27-1H	MCGREGORY BUTTES
18341	3302500976	NWNE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1A-12-1H	MCGREGORY BUTTES
18367	3302500986	SESE 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9D-04-1H	EAGLE NEST
18402	3305303067	SESE 22-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-22D-15-1H	ANTELOPE
18426	3305303073	SWSW 14-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-14C-11-1H	ANTELOPE
18446	3305303080	NENW 18-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-18B-19-1H	FOUR BEARS
18458	3302501002	NENE 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3A-10-1H	MCGREGORY BUTTES
18905	3305303141	NWNW 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13B-24-1H	ANTELOPE
18968	3302501086	NWNE 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-22D-15-1H	EAGLE NEST
18969	3302501087	NWNE 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-27A-34-1H	EAGLE NEST
19038	3310501849	NENW 25-157-100	HRC OPERATING, LLC	FORSETH 157-100-25B-36-1H	MARMON
19048	3310501853	SESE 11-156-101	HRC OPERATING, LLC	BORRUD 156-101-11D-2-1H	TYRONE
19103	3310501862	NENE 28-157-100	HRC OPERATING, LLC	NJOS 157-100-28A-33-1H	MARMON
19169	3310501875	NWNW 11-157-103	HRC OPERATING, LLC	CARLSON 1-11H	STRANDAHL
19257	3310501898	SESE 24-157-102	HRC OPERATING, LLC	ANDERSON 1-24-13H	STRANDAHL
19306	3310501904	NWNW 28-157-102	HRC OPERATING, LLC	SIIRTOLA 1-28-33H	STRANDAHL
19547	3310501960	SWSW 21-157-100	HRC OPERATING, LLC	STATE 157-100-21C-16-1H	MARMON
19598	3310501972	NENE 26-158-99	HRC OPERATING, LLC	OPSAL 158-99-26A-35-1H	ELLISVILLE
19646	3310501985	NWNE 2-157-100	HRC OPERATING, LLC	STORHAUG 157-100-2A-11-1H	DUBLIN
19670	3310501991	NENE 26-157-101	HRC OPERATING, LLC	MONSON TRUST 157-101-26A-35-1H	OTTER
19777	3310502005	NWNW 13-157-101	HRC OPERATING, LLC	ERIKSON 157-101-13B-24-1H	OTTER
19950	3310502036	SESE 31-157-100	HRC OPERATING, LLC	GREV 157-100-31D-30-1H	MARMON
19976	3302501224	SWSW 20-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-29B-32-1H	EAGLE NEST
20063	3310502066	SWSW 32-157-100	HRC OPERATING, LLC	STATE 157-100-32C-29-1H	MARMON
20065	3310502067	NWNW 14-157-101	HRC OPERATING, LLC	ROSSLAND 157-101-14B-23-1H	OTTER
20086	3305303390	LOT 4 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 150-94-3B-10-1H	SPOTTED HORN
20088	3305303392	LOT 4 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-34C-27-1H	ANTELOPE
20172	3302501254	SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23D-14-1H	EAGLE NEST
20173	3302501255	SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26A-35-1H	EAGLE NEST
20252	3302501270	SESE 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-19D-18-1H	EAGLE NEST
20253	3302501271	SESE 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-30A-31-1H	EAGLE NEST
20269	3305303424	SWSW 17-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-17C-08-2H	FOUR BEARS
20328	3305303443	NENW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26B-35-1H	ANTELOPE
20458	3305303486	SESW 17-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-17C-08-3H	FOUR BEARS
20534	3310502153	LOT4 5-157-101	HRC OPERATING, LLC	POECKES 1-32-29H	LITTLE MUDDY
20535	3310502154	LOT4 5-157-101	HRC OPERATING, LLC	PETERSON TRUST 1-5-8H	GOOD LUCK
20552	3310502157	SWSW 21-158-103	HRC OPERATING, LLC	MULLER 1-21-16H	CLIMAX
20553	3310502158	NENE 25-157-103	HRC OPERATING, LLC	RASMUSSEN 1-25-36H	STRANDAHL
20567	3305303521	SESE 22-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-22D-15-2H	ANTELOPE
20614	3310502166	NWNW 17-157-100	HRC OPERATING, LLC	WHITE 157-100-17B-20-1H	MARMON
20707	3310502185	LOT2 1-157-103	HRC OPERATING, LLC	PASTERNAK 1-1-12H	STRANDAHL
20723	3310502187	SWSE 32-158-99	HRC OPERATING, LLC	HOKANSON 158-99-32D-29-1H	ELLISVILLE
20794	3310502198	NWNE 25-158-99	HRC OPERATING, LLC	STATE 158-99-25A-36-1H	ELLISVILLE
20825	3310502200	SESE 8-157-100	HRC OPERATING, LLC	WILLIAMS AND LARSON TRUST 157-100-8D-5-1H	MARMON
20844	3310502204	SESW 21-157-102	HRC OPERATING, LLC	RASMUSSEN 1-21-16H	STRANDAHL
20866	3302501382	SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23D-14-2H	EAGLE NEST
20871	3302501383	SESE 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9D-04-2H	EAGLE NEST
20879	3302501385	NENE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1A-12-2H	MCGREGORY BUTTES
20880	3302501386	NENE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36D-25-2H	MCGREGORY BUTTES
20915	3305303623	LOT4 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 150-94-3B-10-2H	SPOTTED HORN
20916	3305303624	LOT4 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-34C-27-2H	ANTELOPE
20918	3302501389	SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-24C-13-1H	EAGLE NEST
20919	3302501390	SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-1H	EAGLE NEST
20953	3310502222	LOT2 4-157-100	HRC OPERATING, LLC	JOHNSON FAMILY TRUST 157-100-4A-9-1H	MARMON
20989	3310502231	NWNE 18-157-100	HRC OPERATING, LLC	PASTERNAK TRUST 157-100-18A-19-1H	MARMON
20990	3310502232	NENE 18-157-100	HRC OPERATING, LLC	BERG 157-100-7D-6-1H	MARMON
20992	3310502233	NENW 25-157-101	HRC OPERATING, LLC	SYLTE MINERAL TRUST 157-101-25B-36-1H	OTTER
21040	3310502255	SESE 34-158-99	HRC OPERATING, LLC	HELSTAD 158-99-34D-27-1H	ELLISVILLE
21043	3310502258	LOT2 6-157-99	HRC OPERATING, LLC	PANKAKE 157-99-6A-7-1H	DUBLIN
21066	3302501411	SESE 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17D-08-2H	EAGLE NEST
21079	3302501413	SESE 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-19D-18-2H	EAGLE NEST
21080	3302501414	SESE 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-30A-31-2H	EAGLE NEST
21083	3310502272	NENW 28-158-102	HRC OPERATING, LLC	DORIS 1-28-33H	CLIMAX
21161	3310502291	NESE 2-157-100	HRC OPERATING, LLC	OSTAD 157-100-2D-1-1	DUBLIN
21185	3310502296	SWSW 36-158-103	HRC OPERATING, LLC	STATE 1-36-25H	CLIMAX
21207	3310502304	NENW 14-157-101	HRC OPERATING, LLC	STROMME FAMILY TRUST 157-101-11C-2-1H	OTTER
21238	3310502308	NENW 28-158-99	HRC OPERATING, LLC	HELSTAD 158-99-28B-33-1H	ELLISVILLE
Released ~~21326~~	3310502329	NWSW 1-157-100	HRC OPERATING, LLC	SWENSON 157-100-1C-2-1	DUBLIN
21420	3310502350	LOT2 1-157-99	HRC OPERATING, LLC	HOKANSON 157-99-1A-12-1H	LONE TREE LAKE

	21550	3310502371 .NWNE 4-157-103	HRC OPERATING, LLC	SEVEN 1-4-9H	STRANDAHL
Released	~~21588~~	3310502374 .NESE 3-157-100	HRC OPERATING, LLC	SMITH 157-100-3D-1-1	WILDCAT
	21578	3310502376 .SWSE 9-156-101	HRC OPERATING, LLC	BERGER 156-101-9-4-1H	TYRONE
	21610	3310502378 .LOT2 5-157-103	HRC OPERATING, LLC	ARNSON 1-5-8H	STRANDAHL
	21652	3305303814 .NENW 18-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-18B-19-2H	FOUR BEARS
	21653	3305303815 .NENW 18-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-18B-19-3H	FOUR BEARS
	21672	3310502400 .SWSE 10-157-99	HRC OPERATING, LLC	VIG 157-99-10D-3-1H	LONE TREE LAKE
	21703	3310502403 .NENW 13-157-101	HRC OPERATING, LLC	MILLER 157-101-12C-1-1H	OTTER
	21719	3310502411 .LOT2 1-157-102	HRC OPERATING, LLC	HOUGHT 1-1-12H	STRANDAHL
	21800	3305303847 .SESE 8-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-9C-10-1H	FOUR BEARS
	21801	3305303848 .SWSW 9-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-9C-10-2H	FOUR BEARS
	21802	3305303849 .SWSW 9-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-9C-10-3H	FOUR BEARS
	21803	3305303850 .SWSW 9-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-9C-10-4H	FOUR BEARS
	21805	3305303851 .SWSW 9-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-9C-10-5H	FOUR BEARS
	21807	3305303852 .SWSW 9-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-9C-10-6H	FOUR BEARS
	21870	3310502445 .NENW 6-156-101	HRC OPERATING, LLC	AGRIBANK 157-101-34C-27-1H	OTTER
	21900	3302501540 .NENE 2-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2A-11-2H	MCGREGORY BUTTES
	21901	3302501541 .SESE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35D-26-2H	MCGREGORY BUTTES
	21939	3310502462 .NWNE 5-157-102	HRC OPERATING, LLC	PASTERNAK 1-32-29H	CLIMAX
	21940	3310502463 .NWNE 5-157-102	HRC OPERATING, LLC	PASTERNAK 1-5-8H	STRANDAHL
	21963	3302501558 .SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26A-35-2H	EAGLE NEST
	22001	3310502467 .NENW 4-157-102	HRC OPERATING, LLC	PASTERNAK 1-4-9H	STRANDAHL
	22054	3310502474 .NENW 29-157-102	HRC OPERATING, LLC	BOYDS 1-29-32H	STRANDAHL
	22090	3305303907 .SESW 17-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-17C-08-4H	FOUR BEARS
	22128	3310502487 .NENW 30-157-102	HRC OPERATING, LLC	A & B 1-30-31H	STRANDAHL
	22226	3310502498 .NWNE 25-157-102	HRC OPERATING, LLC	JOHNSON 1-25-36H	STRANDAHL
	22298	3302501600 .NWNE 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-27A-34-2H	EAGLE NEST
	22299	3302501601 .NENE 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-27A-34-3H	EAGLE NEST
	22300	3302501602 .NWNE 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-22D-15-2H	EAGLE NEST
	22301	3302501603 .NENE 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-22D-15-3H	EAGLE NEST
	22309	3310502517 .SESW 31-158-102	HRC OPERATING, LLC	THOME 1-6-7H	STRANDAHL
	22310	3310502518 .SESW 31-158-102	HRC OPERATING, LLC	THOME 1-31-30H	CLIMAX
	22312	3302501605 .NWNE 28-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-28A-33-1H	MCGREGORY BUTTES
	22313	3302501606 .NWNE 28-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-28A-33-2H	MCGREGORY BUTTES
	22447	3310502540 .NENW 26-157-102	HRC OPERATING, LLC	J. RASMUSSEN 1-26-35H	STRANDAHL
	22448	3310502541 .NENW 26-157-102	HRC OPERATING, LLC	C. RASMUSSEN 1-23-14H	STRANDAHL
	22456	3310502544 .LOT2 1-157-100	HRC OPERATING, LLC	HOFF 157-100-1A-12-1H	DUBLIN
	22469	3310502545 .SESW 31-158-101	HRC OPERATING, LLC	HOUGHT 1-6-7H	GOOD LUCK
	22470	3310502546 .SESW 31-158-101	HRC OPERATING, LLC	HOUGHT 1-31-30H	LITTLE MUDDY
	22495	3310502548 .LOT3 1-156-101	HRC OPERATING, LLC	BORRUD 156-101-1-12-1H	TYRONE
	22503	3302501642 .SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-2H	EAGLE NEST
Released	~~22504~~	3302501643 .SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-24C-13-2H	EAGLE NEST
	22506	3310502551 .SESW 22-157-101	HRC OPERATING, LLC	ROSSLAND 157-101-22C-15-1H	OTTER
	22518	3310502555 .NWNE 27-157-102	HRC OPERATING, LLC	QUARNE 1-27-34H	STRANDAHL
	22545	3310502559 .SWSE 9-158-102	HRC OPERATING, LLC	J HAUGEN 1-9-4H	CLIMAX
	22560	3302501647 .SENE 21-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-21A-20-1H	EAGLE NEST
	22561	3302501648 .SENE 21-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-21A-20-2H	EAGLE NEST
	22562	3302501649 .SENE 21-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-21A-20-3H	EAGLE NEST
	22589	3310502566 .LOT3 3-157-101	HRC OPERATING, LLC	KING 157-101-3B-10-1H	OTTER
	22672	3310502578 .NWNE 18-158-101	HRC OPERATING, LLC	PEDERSON 1-18-19H	LITTLE MUDDY
	22707	3305304065 .NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26B-35-3H	ANTELOPE
	22708	3305304066 .NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26B-35-2H	ANTELOPE
	22822	3310502602 .SWSE 20-157-101	HRC OPERATING, LLC	BERG 1-29-32H	GOOD LUCK
	22823	3310502603 .SWSE 20-157-101	HRC OPERATING, LLC	BERG 1-20-17H	GOOD LUCK
	22826	3310502604 .LOT1 2-157-99	HRC OPERATING, LLC	HELSTAD 157-99-2A-11-1H	LONE TREE LAKE
	22878	3302501700 .NENW 22-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-22B-27-5H	MCGREGORY BUTTES
	22979	3302501726 .SESW 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9C-04-5H	EAGLE NEST
	22980	3302501727 .SESW 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9C-04-4H	EAGLE NEST
	22981	3302501728 .SESW 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9C-04-3H	EAGLE NEST
	22983	3302501729 .SWSW 20-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-29B-32-2H	EAGLE NEST
	23120	3310502666 .NWNE 27-157-102	HRC OPERATING, LLC	HOUGHT F.T. 1-22-15H	STRANDAHL
	23123	3302501762 .SWSE 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-19D-18-3H	EAGLE NEST
	23124	3302501763 .SWSE 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-30A-31-3H	EAGLE NEST
	23223	3302501781 .NENE 22-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-22A-27-2H	MCGREGORY BUTTES
	23252	3310502702 .SWSE 34-158-102	HRC OPERATING, LLC	ANDRE 1-34-27H	CLIMAX
	23253	3310502703 .SWSE 34-158-102	HRC OPERATING, LLC	PASTERNAK 1-3-10H	STRANDAHL
	23258	3302501788 .SESE 34-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3A-10-2H	MCGREGORY BUTTES
	23382	3302501816 .NWNW 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1B-12-3H	MCGREGORY BUTTES
	23383	3302501817 .NWNW 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-3H	MCGREGORY BUTTES
	23505	3305304295 .SESE 17-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-17D-08-7H	FOUR BEARS
	23506	3305304296 .SESE 17-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-17D-08-6H	FOUR BEARS
	23507	3305304297 .SESE 17-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-17D-08-5H	FOUR BEARS
	23550	3305304316 .SWSW 14-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-14C-11-2H	ANTELOPE
	23554	3305304317 .SESE 14-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-14D-11-4H	ANTELOPE
	23555	3305304318 .SESE 14-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-14D-11-3H	ANTELOPE
	23596	3310502771 .LOT 3 2-157-102	HRC OPERATING, LLC	PASTERNAK FEDERAL 1-2-11H	STRANDAHL
	23597	3310502772 .NENW 30-157-101	HRC OPERATING, LLC	BERG 1-30-31H	GOOD LUCK
	23621	3310502774 .NENW 30-157-101	HRC OPERATING, LLC	BERG 1-19-18H	GOOD LUCK
	23706	3310502789 .LOT3 2-157-102	HRC OPERATING, LLC	MILLER 1-35-26H	CLIMAX
	23722	3310502793 .LOT3 1-157-102	HRC OPERATING, LLC	HOUGHT 2-1-12H	STRANDAHL
	23723	3310502794 .LOT3 1-157-102	HRC OPERATING, LLC	H STATE 1-36-25H	CLIMAX
Released	~~24107~~	3310502849 .NENW 15-157-103	HRC OPERATING, LLC	G LARSEN 1-15-22H	STRANDAHL
	24108	3310502850 .NWNE 14-157-103	HRC OPERATING, LLC	G LARSEN 1-14-23H	STRANDAHL

24150	3302501938	.SWSW 27-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-27C-22-3H	MCGREGORY BUTTES
24220	3305304527	.NENW 26-149-98	HRC OPERATING, LLC	BERG TRUST FEDERAL 1-26-35H	PEMBROKE
24231	3310502866	.NWNE 13-158-102	HRC OPERATING, LLC	GLIMM 1-13-24H	CLIMAX
Released ~~24238~~	3310502869	NWNE 13-158-102	HRC OPERATING, LLC	HAGEN 1-12-1H	CLIMAX
24248	3310502870	.NENW 14-158-102	HRC OPERATING, LLC	OYEN 1-11-2H	CLIMAX
24249	3310502871	.NENW 14-158-102	HRC OPERATING, LLC	POECKES 1-14-23H	CLIMAX
24253	3305304535	.NWNE 18-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7D-6-4H	FOUR BEARS
24254	3305304536	.NWNE 18-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7D-6-3H	FOUR BEARS
24255	3305304537	.NWNE 18-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7D-6-2H	FOUR BEARS
24256	3305304538	.NWNE 18-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7D-6-1H	FOUR BEARS
24270	3302501962	.NENW 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3B-10-5H	MCGREGORY BUTTES
24271	3302501963	.NENW 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3B-10-4H	MCGREGORY BUTTES
24272	3302501964	.NENW 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3B-10-3H	MCGREGORY BUTTES
24297	3302501970	.NWNE 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13A-24-5H	EAGLE NEST
24298	3302501971	.NWNE 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13A-24-4H	EAGLE NEST
24299	3302501972	.NWNE 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13A-24-3H	EAGLE NEST
24306	3302501975	.NWNE 29-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-29A-32-3H	EAGLE NEST
24307	3302501976	.NWNE 29-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-29A-32-4H	EAGLE NEST
24310	3302501979	.NWNE 29-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-29A-32-5H	EAGLE NEST
24338	3302501983	.SESE 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33D-28-4H	MCGREGORY BUTTES
24339	3302501984	.SESE 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33D-28-5H	MCGREGORY BUTTES
24345	3310502883	.NENW 17-158-101	HRC OPERATING, LLC	PEDERSON 1-17-20H	LITTLE MUDDY
Released ~~24346~~	3310502884	.NENW 17-158-101	HRC OPERATING, LLC	PEDERSON 1-8-5H	LITTLE MUDDY
24417	3302501994	.SESW 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17C-08-4H	EAGLE NEST
24418	3302501995	.SWSW 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17C-08-3H	EAGLE NEST
Released ~~24535~~	3310502923	.SWSE 10-158-102	HRC OPERATING, LLC	POECKES 1-10-3H	CLIMAX
24536	3310502924	.SWSE 10-158-102	HRC OPERATING, LLC	POECKES 1-15-22H	CLIMAX
Released ~~24584~~	3310502932	.LOT3 3-157-101	HRC OPERATING, LLC	KING 157-101-3B-10-2H	OTTER
24588	3310502933	.SESW 22-157-101	HRC OPERATING, LLC	ROSSLAND 157-101-22C-15-2H	OTTER
24679	3310502956	.LOT3 2-157-100	HRC OPERATING, LLC	STORHAUG 157-100-2B-11-2H	DUBLIN
24731	3305304708	.NWNW 15-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-15B-22-3H	ANTELOPE
24737	3305304709	.NWNE 15-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-15A-22-7H	ANTELOPE
24738	3305304710	.NWNE 15-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-15B-22-6H	ANTELOPE
24739	3305304711	.NWNE 15-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-15B-22-5H	ANTELOPE
Released ~~24824~~	3310502984	.SESW 7-157-100	HRC OPERATING, LLC	PASTERNAK TRUST 157-100-18B-19-2H	MARMON
Released ~~24825~~	3310502985	.SESW 7-157-100	HRC OPERATING, LLC	BERG 157-100-7C-6-2H	MARMON
25207	3302502090	.NENW 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-27B-34-4H	EAGLE NEST
25208	3302502091	.NENW 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-22C-15-4H	EAGLE NEST
25209	3302502092	.SESW 22-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-27B-34-5H	EAGLE NEST
25210	3302502093	.SESW 22-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-22C-15-5H	EAGLE NEST
25370	3305304927	.NWNW 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13B-24-2H	ANTELOPE
25399	3305304938	.NENE 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13A-24-4H	ANTELOPE
25400	3305304939	.NENE 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13A-24-3H	ANTELOPE
25443	3310503046	.NWNW 25-157-102	HRC OPERATING, LLC	ANN H. THOME 3-25-36H	STRANDAHL
25444	3310503047	.NWNW 25-157-102	HRC OPERATING, LLC	ANN H. THOME 4-25-36H	STRANDAHL
25445	3310503048	.NENW 25-157-102	HRC OPERATING, LLC	ANN H. THOME 5-25-36H	STRANDAHL
25494	3305304963	.NWNW 15-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-15B-22-4H	ANTELOPE
25498	3310503060	.SWSE 20-157-100	HRC OPERATING, LLC	STATE 157-100-29A-32-2H	MARMON
25499	3310503061	.SWSE 20-157-100	HRC OPERATING, LLC	MOLINE 157-100-20D-17-2H	MARMON
25502	3302502146	.SESW 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17C-8-5H	EAGLE NEST
Released ~~25504~~	3302502147	.SENE 25-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25A-36-5H	EAGLE NEST
Released ~~25505~~	3302502148	.SENE 25-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25A-36-4H	EAGLE NEST
Released ~~25506~~	3302502149	.SENE 25-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25A-36-3H	EAGLE NEST
25524	3305304969	.SESW 2-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-11B-14-5H	ANTELOPE
25525	3305304970	.SESW 2-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-11B-14-6H	ANTELOPE
25526	3305304971	.SESW 2-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-11B-14-7H	ANTELOPE
25534	3302502154	.SWSW 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33C-28-3H	EAGLE NEST
25556	3302502157	.NWNE 29-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-29A-32-8TFH	EAGLE NEST
25557	3302502158	.NWNE 29-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-29A-32-9TFH	EAGLE NEST
25562	3310503077	.LOT3 2-156-101	HRC OPERATING, LLC	BORRUD 156-101-2A-11-2H	TYRONE
25570	3310503082	.SESE 24-157-102	HRC OPERATING, LLC	JOHNSON 7-25-36H	STRANDAHL
25596	3302502165	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-5H	MCGREGORY BUTTES
25597	3302502166	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-4H	MCGREGORY BUTTES
25598	3302502167	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-3H	MCGREGORY BUTTES
25793	3310503107	.NWNW 28-157-100	HRC OPERATING, LLC	NJOS 157-100-28B-33-2H	MARMON
25800	3302502185	.NENW 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3B-10-8TFH	MCGREGORY BUTTES
25801	3302502186	.NENW 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3B-10-7H	MCGREGORY BUTTES
25988	3302502209	.SWSW 20-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-20C-21-5H	EAGLE NEST
25989	3302502210	.SWSW 20-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-20C-21-4H	EAGLE NEST
25992	3310503129	.LOT1 2-157-102	HRC OPERATING, LLC	PASTERNAK FEDERAL 2-2-11H	STRANDAHL
26084	3310503149	.SWSE 21-157-102	HRC OPERATING, LLC	QUARNE 2-21-16H	STRANDAHL
26116	3310503156	.SESW 19-157-100	HRC OPERATING, LLC	GREV 157-100-30B-31-3H	MARMON
26117	3310503157	.LOT4 19-157-100	HRC OPERATING, LLC	PASTERNAK TRUST 157-100-19C-18-3H	MARMON
26118	3310503158	.LOT4 19-157-100	HRC OPERATING, LLC	GREV 157-100-30B-31-2H	MARMON
26119	3310503159	.LOT4 19-157-100	HRC OPERATING, LLC	PASTERNAK TRUST 157-100-19C-18-2H	MARMON
26209	3310503171	.SESE 31-158-102	HRC OPERATING, LLC	CHRISTINE JOE 2-31-30H	CLIMAX
26210	3310503172	.SWSE 20-157-100	HRC OPERATING, LLC	STATE 157-100-29A-32-3H	MARMON
26211	3310503173	.SWSE 20-157-100	HRC OPERATING, LLC	MOLINE 157-100-20D-17-3H	MARMON
26279	3302502243	.SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-4H	MCGREGORY BUTTES
26280	3302502244	.SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1B-12-4H	MCGREGORY BUTTES
26281	3302502245	.SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-5H	MCGREGORY BUTTES
26282	3302502246	.SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1B-12-5H	MCGREGORY BUTTES
26293	3302502254	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-5H	MCGREGORY BUTTES

26294	3302502255	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-4H	MCGREGORY BUTTES
26295	3302502256	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-3H	MCGREGORY BUTTES
26322	3302502260	.NENW 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-27B-34-8H	EAGLE NEST
26323	3302502261	.NENW 27-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-22C-15-9H	EAGLE NEST
26341	3310503189	.SESE 12-157-101	HRC OPERATING, LLC	MILLER 157-101-12D-1-3H	OTTER
26342	3310503190	.SESE 12-157-101	HRC OPERATING, LLC	MILLER 157-101-12D-1-2H	OTTER
R ~~26372~~	3310503193	SESW 33-158-100	HRC OPERATING, LLC	STROMME TRUST 157-100-4B-9-2H	MARMON
R ~~26373~~	3310503194	SESW 33-158-100	HRC OPERATING, LLC	STROMME TRUST 157-100-4B-9-3H	MARMON
26414	3310503204	NENE 25-157-101	HRC OPERATING, LLC	BERG 157-101-24D-13-2H	OTTER
26415	3310503205	NENE 25-157-101	HRC OPERATING, LLC	SYLTE MINERAL TRUST 157-101-25A-36-2H	OTTER
R ~~26416~~	3310503206	NENE 25-157-101	HRC OPERATING, LLC	ERIKSON 157-101-24D-13-3H	OTTER
26417	3310503207	NENE 25-157-101	HRC OPERATING, LLC	SYLTE MINERAL TRUST 157-101-25A-36-3H	OTTER
26671	3302502306	NENW 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3B-10-9TFH	MCGREGORY BUTTES
R ~~26692~~	3310503253	NENW 25-157-103	HRC OPERATING, LLC	HAGBOS 2-25-36H	STRANDAHL
26796	3305305403	.SWSE 24-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-24D-13-7H	ANTELOPE
26797	3305305404	.SWSE 24-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-24D-13-6H	ANTELOPE
26798	3305305405	.SWSE 24-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-24D-13-5H	ANTELOPE
26815	3310503275	LOT4 3-157-99	HRC OPERATING, LLC	HELSTAD 158-99-34C-27-2H	ELLISVILLE
26816	3310503276	LOT4 3-157-99	HRC OPERATING, LLC	JOHNSON 157-99-3B-10-2H	LONE TREE LAKE
26817	3310503277	LOT4 3-157-99	HRC OPERATING, LLC	HELSTAD 158-99-34C-27-3H	ELLISVILLE
26818	3310503278	LOT4 3-157-99	HRC OPERATING, LLC	JOHNSON 157-99-3B-10-3H	LONE TREE LAKE
26824	3310503282	NENE 25-157-101	HRC OPERATING, LLC	SYLTE MINERAL TRUST 157-101-25A-36-4H	OTTER
26865	3302502337	.SWSW 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33C-28-8H	MCGREGORY BUTTES
26866	3302502338	.SWSW 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33C-28-9H	MCGREGORY BUTTES
26867	3302502339	.SWSW 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33C-28-10H	MCGREGORY BUTTES
R ~~26868~~	3302502340	SWSW 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33C-28-11H	MCGREGORY BUTTES
26906	3305305443	.SESW 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-7H	FOUR BEARS
26907	3305305444	.SESW 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-6H	FOUR BEARS
26913	3305305449	SESE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-5H	FOUR BEARS
26914	3305305450	.SESE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-4H	FOUR BEARS
26917	3310503299	SWSE 24-157-103	HRC OPERATING, LLC	JANE NELSON 34-24H	STRANDAHL
27000	3310503320	.NWNE 25-157-100	HRC OPERATING, LLC	NELSON 157-100-25A-36-2H	MARMON
27001	3310503321	.NWNE 25-157-100	HRC OPERATING, LLC	NELSON 157-100-25A-36-3H	MARMON
27002	3310503322	.NWNE 25-157-100	HRC OPERATING, LLC	NELSON 157-100-25A-36-4H	MARMON
27045	3302502362	.SWSW 20-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-20C-21-6H	EAGLE NEST
27058	3310503331	.SESE 12-157-101	HRC OPERATING, LLC	MILLER 157-101-12D-1-4H	OTTER
27102	3302502365	SWSW 27-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-27C-22-9H	MCGREGORY BUTTES
27103	3302502366	.SWSW 27-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-27C-22-8H	MCGREGORY BUTTES
27105	3302502367	.SWSW 27-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-27C-22-7H	MCGREGORY BUTTES
27106	3302502368	.SWSW 27-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-27C-22-6H	MCGREGORY BUTTES
27107	3302502369	.SWSW 27-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-27C-22-4H	MCGREGORY BUTTES
27125	3302502370	.SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23D-14-6H	EAGLE NEST
27126	3302502371	.SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26A-35-10H	EAGLE NEST
27127	3302502372	.SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23D-14-7H	EAGLE NEST
Released ~~27198~~	3310503353	SESW 19-157-100	HRC OPERATING, LLC	PASTERNAK TRUST 157-100-19C-18-4H	MARMON
27277	3302502395	.SESW 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-19C-18-4H	EAGLE NEST
27278	3302502396	.SESW 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-30B-31-4H	EAGLE NEST
27279	3302502397	.SESW 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-19C-18-5H	EAGLE NEST
27280	3302502398	.SESW 19-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-30B-31-5H	EAGLE NEST
27412	3302502420	.SESW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-7H	EAGLE NEST
27414	3302502421	.SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-6H	EAGLE NEST
27415	3302502422	.SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-5H	EAGLE NEST
27416	3302502423	.SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-4H	EAGLE NEST
27417	3302502424	.SWSW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-3H	EAGLE NEST
27431	3302502425	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23C-14-3H	EAGLE NEST
27432	3302502426	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23C-14-8H	EAGLE NEST
27433	3302502427	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23C-14-4H	EAGLE NEST
27434	3302502428	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23C-14-9H	EAGLE NEST
27435	3302502429	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23C-14-5H	EAGLE NEST
27456	3302502439	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26B-35-3H	EAGLE NEST
27457	3302502440	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26B-35-9H	EAGLE NEST
27458	3302502441	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26B-35-4H	EAGLE NEST
27459	3302502442	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26B-35-8H	EAGLE NEST
27460	3302502443	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26B-35-5H	EAGLE NEST
27646	3302502464	.SESE 23-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-26A-35-14H	EAGLE NEST
28280	3302502524	.SESW 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17C-8-6H	EAGLE NEST
28281	3302502525	.SESW 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17C-8-7H	EAGLE NEST
28296	3305305899	.SESE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-10H	FOUR BEARS
28297	3305305900	.SESE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-11H	FOUR BEARS
28298	3305305901	.SESE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-14H	FOUR BEARS
28628	3302502583	NWNE 28-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-28B-33-13H	MCGREGORY BUTTES
28629	3302502584	NWNE 28-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-28B-33-12H	MCGREGORY BUTTES
R ~~28691~~	3302502587	NENW 25-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-25B-36-7H	MCGREGORY BUTTES
R ~~28692~~	3302502588	NENW 25-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-25B-36-8H	MCGREGORY BUTTES
R ~~28693~~	3302502589	NENW 25-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-25B-36-9H	MCGREGORY BUTTES
29134	3302502641	SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-6H	MCGREGORY BUTTES
29135	3302502642	SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1B-12-6H	MCGREGORY BUTTES
29136	3302502643	SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1B-12-7H	MCGREGORY BUTTES
29137	3302502644	SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-12H	MCGREGORY BUTTES
29238	3310503702	.LOT3 2-156-101	HRC OPERATING, LLC	BORRUD 156-101-2B-11-3H	TYRONE
29239	3310503703	.LOT3 2-156-101	HRC OPERATING, LLC	BORRUD 156-101-2B-11-4H	TYRONE
29240	3310503704	.LOT3 2-156-101	HRC OPERATING, LLC	BORRUD 156-101-2B-11-5H	TYRONE
29538	3310503784	LOT3 1-156-101	HRC OPERATING, LLC	BORRUD 156-101-1B-12-3H	TYRONE

29539	3310503785	LOT3 1-156-101	HRC OPERATING, LLC	BORRUD 156-101-1B-12-2H	TYRONE
29571	3302502681	.SESE 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33D-28-6H	MCGREGORY BUTTES
29572	3302502682	.SESE 33-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-33D-28-7H	MCGREGORY BUTTES
29787	3310503826	LOT3 1-156-101	HRC OPERATING, LLC	BORRUD 156-101-2A-11-6H	TYRONE
29847	3302502722	.NENE 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3A-10-6H	MCGREGORY BUTTES
29848	3302502723	.NENE 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3A-10-10H	MCGREGORY BUTTES
29849	3302502724	.NENE 3-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-3A-10-12H	MCGREGORY BUTTES
30241	3305306579	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-13H	ANTELOPE
30242	3305306580	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-12H	ANTELOPE
30243	3305306581	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-11H	FOUR BEARS
30244	3305306582	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-10H	FOUR BEARS
30245	3305306583	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-9H	FOUR BEARS
30246	3305306584	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-8H	FOUR BEARS
30247	3305306585	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-7H	FOUR BEARS
30248	3305306586	.SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-6H	FOUR BEARS
R ~~30267~~	3302502793	SESE 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17D-8-11H	EAGLE NEST
30268	3302502794	.SESE 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17D-8-12H	EAGLE NEST
30269	3302502795	.SESE 17-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-17D-8-13H	EAGLE NEST
30541	3305306668	NENE 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26A-35-4H	ANTELOPE
30542	3305306669	NENE 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26A-35-5H	ANTELOPE
30543	3305306670	NENE 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26A-35-6H	ANTELOPE
30544	3305306671	NENE 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26A-35-7H	ANTELOPE
30545	3305306672	NENE 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26A-35-8H	ANTELOPE
30546	3305306673	NENE 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26A-35-9H	ANTELOPE
30555	3302502833	NWNW 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13B-24-2H	EAGLE NEST
30556	3302502834	NWNW 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13B-24-10H	EAGLE NEST
30557	3302502835	NENW 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13B-24-11H	EAGLE NEST
30558	3302502836	NENW 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13B-24-12H	EAGLE NEST
30559	3302502837	NENW 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13B-24-13H	EAGLE NEST
30564	3302502840	.NENW 26-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-23C-14-10H	EAGLE NEST
30679	3302502851	.NWNE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1A-12-10H	MCGREGORY BUTTES
30680	3302502852	.NWNE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1A-12-9H	MCGREGORY BUTTES
30726	3305306729	NENE 26-149-98	HRC OPERATING, LLC	BERG TRUST FEDERAL 149-98-26A-35-6H	PEMBROKE
30727	3305306730	NENE 26-149-98	HRC OPERATING, LLC	BERG TRUST FEDERAL 149-98-26A-35-7H	PEMBROKE
30728	3305306731	NENE 26-149-98	HRC OPERATING, LLC	BERG TRUST FEDERAL 149-98-26A-35-9H	PEMBROKE
30729	3305306732	NENE 26-149-98	HRC OPERATING, LLC	BERG TRUST FEDERAL 7-26-35H149-98-26A-35-10H	PEMBROKE
30783	3305306750	.SWSE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-12H	FOUR BEARS
30784	3305306751	.SWSE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-8H	FOUR BEARS
30785	3305306752	.SWSE 19-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-19D-18-9H	FOUR BEARS
31076	3302502901	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-6H	MCGREGORY BUTTES
31077	3302502902	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-7H	MCGREGORY BUTTES
31078	3302502903	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-8H	MCGREGORY BUTTES
released ~~31079~~	3302502904	SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-10H	MCGREGORY BUTTES
31080	3302502905	.SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2B-11-9H	MCGREGORY BUTTES
31081	3302502906	SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-10H	MCGREGORY BUTTES
31082	3302502907	SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-7H	MCGREGORY BUTTES
31083	3302502908	SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-9H	MCGREGORY BUTTES
31084	3302502909	SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-8H	MCGREGORY BUTTES
31085	3302502910	SESW 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35C-26-6H	MCGREGORY BUTTES
31154	3302502923	NWNE 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13A-24-6H	EAGLE NEST
31155	3302502924	NWNE 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13A-24-7H	EAGLE NEST
31156	3302502925	NWNE 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13A-24-8H	EAGLE NEST
31161	3302502926	.NENE 22-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-22A-27-11H	MCGREGORY BUTTES
31188	3302502934	.SESW 24-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-25B-36-8H	EAGLE NEST
31454	3305307028	LOT3 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 150-94-3B-10-10H	SPOTTED HORN
31455	3305307029	LOT3 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 150-94-3B-10-11H	SPOTTED HORN
31456	3305307030	LOT3 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 150-94-3B-10-12H	SPOTTED HORN
31457	3305307031	LOT3 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 150-94-3B-10-13H	SPOTTED HORN
31458	3305307032	LOT3 3-150-94	HRC OPERATING, LLC	FORT BERTHOLD 150-94-3B-10-3H	SPOTTED HORN
31462	3302502963	SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-7H	MCGREGORY BUTTES
31463	3302502964	SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-9H	MCGREGORY BUTTES
31464	3302502965	SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36C-25-8H	MCGREGORY BUTTES
31697	3302502974	.NENE 22-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-22A-27-12H	MCGREGORY BUTTES
31774	3305307183	NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-27A-34-16H	ANTELOPE
31775	3305307184	NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-27A-34-15H	ANTELOPE
31776	3305307185	NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26B-35-12H	ANTELOPE
31777	3305307186	NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26B-35-11H	ANTELOPE
31778	3305307187	NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26B-35-10H	ANTELOPE
31889	3305307231	.SESE 22-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-22D-15-10H	ANTELOPE
31890	3305307232	.SESE 22-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-22D-15-11H	ANTELOPE
31994	3305307274	NENE 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13A-24-15H	ANTELOPE
31995	3305307275	NENE 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13A-24-16H	ANTELOPE
32156	3305307343	NENW 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13B-24-12H	ANTELOPE
32157	3305307344	NENW 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13B-24-11H	ANTELOPE
32158	3305307345	NWNW 13-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-13B-24-13H	ANTELOPE
32232	3305307387	NENW 15-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-15A-22-9H	ANTELOPE
32233	3305307388	NENW 15-152-94	HRC OPERATING, LLC	FORT BERTHOLD 152-94-15A-22-8H	ANTELOPE
32409	3302503095	SESE 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9D-4-7H	EAGLE NEST
32410	3302503096	SESE 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9D-4-6H	EAGLE NEST
32411	3302503097	SESE 9-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-9D-4-12H	EAGLE NEST
32431	3305307466	NWNW 26-151-94	HRC OPERATING, LLC	FORT BERTHOLD 151-94-26B-35-13H	ANTELOPE
32503	3302503115	.NENE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1A-12-11H	MCGREGORY BUTTES
32504	3302503116	.NENE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36D-25-11H	MCGREGORY BUTTES

32505	3302503117 .NENE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1A-12-12H	MCGREGORY BUTTES
32506	3302503118 .NENE 1-147-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-36D-25-10H	MCGREGORY BUTTES
32579	3305307548 .SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-5H	FOUR BEARS
32580	3305307549 .SESW 7-152-93	HRC OPERATING, LLC	FORT BERTHOLD 152-93-7C-6-14H	FOUR BEARS
32608	3302503132 .SESE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35D-26-11H	MCGREGORY BUTTES
32609	3302503133 .SESE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2A-11-13H	MCGREGORY BUTTES
32610	3302503134 .SESE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2A-11-12H	MCGREGORY BUTTES
32611	3302503135 .SESE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35D-26-12H	MCGREGORY BUTTES
32612	3302503136 .SESE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 148-94-35D-26-13H	MCGREGORY BUTTES
32613	3302503137 .SESE 35-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-2A-11-11H	MCGREGORY BUTTES
33124	3302503240 .SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1B-12-13H	MCGREGORY BUTTES
33125	3302503241 .SESW 36-148-94	HRC OPERATING, LLC	FORT BERTHOLD 147-94-1B-12-8H	MCGREGORY BUTTES
33335	3310504368 .LOT3 1-156-101	HRC OPERATING, LLC	BORRUD 156-101-1B-12-4H	TYRONE
33336	3310504369 .LOT3 1-156-101	HRC OPERATING, LLC	BORRUD 156-101-1B-12-5H	TYRONE
33594	3302503308 .NWNW 13-148-95	HRC OPERATING, LLC	FORT BERTHOLD 148-95-13B-24-9H	EAGLE NEST
90154	3310590154 .SESE 1-157-100	HRC OPERATING, LLC	PETRO-HUNT 157-100-1C-4-2SWD	DUBLIN
90155	3310590155 .NESE 1-157-100	HRC OPERATING, LLC	PETRO-HUNT 157-100-1C-1-1SWD	DUBLIN
90211	3310590211 .SWSW 1-157-103	HRC OPERATING, LLC	MANGER 1 SWD	STRANDAHL
90227	3310590227 .NWNW 28-157-102	HRC OPERATING, LLC	SIIRTOLA 1 SWD	STRANDAHL

NORTH DAKOTA
OIL AND GAS DIVISION

Oil and Gas Division

20552

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director
Department of Mineral Resources
Lynn D. Helms - Director
North Dakota Industrial Commission
www.dmr.nd.gov/oilgas

August 14, 2015

Mr. Lawrence Bender
Fredrikson & Byron, P.A.
1133 College Drive, Suite 1000
Bismarck, ND 58501-1215

RE: Muller #1-21-16H
SWSW Sec. 21, T.158N., R.103W.
Williams County, North Dakota
Climax Field
Well File No. 20552
STRIPPER WELL DETERMINATION

Dear Mr. Bender:

HRC Operating, LLC (HRC) filed with the North Dakota Industrial Commission – Oil and Gas Division (Commission) on July 22, 2015 an application for a Stripper Well Property Determination for the above captioned well.

Information contained in the application indicates that the above mentioned well is a property pursuant to statute and rule, and HRC has elected to designate said well as a separate property for stripper well purposes. The well produced from a well depth greater than 10000 feet. During the qualifying period, March 1, 2014 through February 28, 2015, the well produced at a maximum efficient rate and the average daily production from the well was 24.6 barrels of oil per day during this period.

It is therefore determined that the above captioned well qualifies as a "Stripper Well Property" pursuant to Section 57-51.1-01 of the North Dakota Century Code. This determination is applicable only to the Bakken Pool in and under said property.

The Commission shall have continuing jurisdiction, and shall have the authority to review the matter, and to amend or rescind the determination if such action is supported by additional or newly discovered information. If you have any questions, do not hesitate to contact me.

Sincerely,

David J. McCusker
Petroleum Engineer

Cc: ND Tax Department

North Dakota Industrial Commission Follow-up Spill Report

API Number	Well File or Facility No
33 - 105 - 02157	20552

DEC 2014 RECEIVED ND OIL & GAS DIVISION

Operator	Telephone Number
HRC Operating, LLC	

Address	City	State	Zip Code
1801 California Street - Suite 3500	Denver	CO	80202

Well Name and Number or Facility Name	Field
Muller 1-21-16H	Climax

Location of Well or Facility	Footages	Qtr-Qtr	Section	Township	Range	County
	300 F N L 1270 F W L	SWSW	21	158 N	103 W	Williams

Description of Spill Location if not on Well or Facility Site and/or Distance and Direction from Well or Facility
All remained within constructed secondary containment

Directions to Site
US 85 (N. Hwy 2) - N. to Co 10 (72nd St NW) - W. to 153rd Ave NW - N. to 74th St NW - W. 0.8 miles - N. side of Rd

Release Discovered By	Date Release Discovered	Time Release Discovered	Date Release Controlled	Time Release Controlled
3rd Party Oil Hauler	March 28, 2014	4 : 00 PM	March 28, 2014	4 : 15 PM

Company Personnel Notified	How Notified	Date Notified	Time Notified
HRC - EHS/Environmental	phone/site visit	March 28, 2014	5 : 00 PM

Type of Incident	Root Cause of Release	Date Clean up Activities Concluded
Valve/Piping Connections Leak	Human Error	

Distance to Nearest Residence or Occupied Building	Distance to Nearest Fresh Water Well
1 Miles	1 Miles

Piping Specifics (If Applicable)	Size (Decimal Format)	Type	Location of Piping
	"		

Volume of Release	Oil	Saltwater	Other
		5.00 Barrels	
Volume of Release Recovered	Oil	Saltwater	Other
		5.00 Barrels	

Was Release Contained Within Dike	If No, Was Release Contained on Well Site	If No, Was Release Contained on Facility Site or Pipeline ROW
Yes		

Areal Extent of Release if not Within Dike	Affected Medium	General Land Use
Within Dike	Well/Facility Soil	Well/Facility Site

Describe Cause of Release or Fire and Other Type of Incidents, Root Causes of Release, Land Uses, and Released Substances
Newly installed remained open after LOTO was removed

Action Taken to Control Release and Clean Up Action Undertaken
Valve closed

Potential Environmental Impacts
No remaining impacts expected at this time

Planned Future Action and/or Action Taken to Prevent Reoccurrence
Review LOTO procedures with contractors

Where Were Recovered Liquids Disposed	Where Were Recovered Solids Disposed
Tervita	IHD

Weather Conditions	Wind Speed	Wind Direction	Temperature	Skies	Estimated Cleanup Cost	Damage Value
	5 MPH		25 ° F		$	$

Regulatory Agencies/Others Notified	Person Notified	Date Notified	Time Notified	Notified By
NDIC/NDDH	Cody Vanderbush	March 28, 2014	:	
Fee Surface Owner			:	
			:	

Federal Agency Lease Number				
BLM			:	
USFS			:	

Report Originator	Title	Date
Kelly Grimm	Environmental Specialist	

Signature	Date
Kelly Grimm	12/9/2014

North Dakota Industrial Commission Follow-up Spill Report

API Number	Well File or Facility No
33 - 105 - 02157	20552

DEC 2014 RECEIVED ND OIL & GAS DIVISION

Operator	Telephone Number
HRC Operating, LLC	

Address	City	State	Zip Code
1801 California Street - Suite 3500	Denver	CO	80202

Well Name and Number or Facility Name	Field
Muller 1-21-16H	Climax

Location of Well or Facility	Footages	Qtr-Qtr	Section	Township	Range	County
	300 F N L 1270 F W L	SWSW	21	158 N	103 W	Williams

Description of Spill Location if not on Well or Facility Site and/or Distance and Direction from Well or Facility
All remained within constructed secondary containment

Directions to Site
US 85 (N. Hwy 2) - N. to Co 10 (72nd St NW) - W. to 153rd Ave NW - N. to 74th St NW - W. 0.8 miles - N. side of Rd

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3rd Party Oil Hauler	March 28, 2014	4 : 00 PM	March 28, 2014	4 : 15 PM

Company Personnel Notified	How Notified	Date Notified	Time Notified
HRC - EHS/Environmental	phone/site visit	March 28, 2014	5 : 00 PM

Type of Incident	Root Cause of Release	Date Clean up Activities Concluded
Valve/Piping Connections Leak	Human Error	

Distance to Nearest Residence or Occupied Building	Distance to Nearest Fresh Water Well
1 Miles	1 Miles

Piping Specifics (If Applicable)	Size (Decimal Format)	Type	Location of Piping
	"		

Volume of Release	Oil	Saltwater	Other
		5.00 Barrels	
Volume of Release Recovered	Oil	Saltwater	Other
		5.00 Barrels	

Was Release Contained Within Dike	If No, Was Release Contained on Well Site	If No, Was Release Contained on Facility Site or Pipeline ROW
Yes		

Areal Extent of Release if not Within Dike	Affected Medium	General Land Use
Within Dike	Well/Facility Soil	Well/Facility Site

Describe Cause of Release or Fire and Other Type of Incidents, Root Causes of Release, Land Uses, and Released Substances
Newly installed remained open after LOTO was removed

Action Taken to Control Release and Clean Up Action Undertaken
Valve closed

Potential Environmental Impacts
No remaining impacts expected at this time

Planned Future Action and/or Action Taken to Prevent Reoccurrence
Review LOTO procedures with contractors

Where Were Recovered Liquids Disposed	Where Were Recovered Solids Disposed
Tervita	IHD

Weather Conditions	Wind Speed	Wind Direction	Temperature	Skies	Estimated Cleanup Cost	Damage Value
	5 MPH		25 ° F		$	$

Regulatory Agencies/Others Notified	Person Notified	Date Notified	Time Notified	Notified By
NDIC/NDDH	Cody Vanderbush	March 28, 2014	:	
Fee Surface Owner			:	
			:	

Federal Agency Lease Number				
BLM			:	
USFS			:	

Report Originator	Title	Date
Kelly Grimm	Environmental Specialist	

Signature	Date
Kelly Grimm	12/9/2014

Industrial Commission of North Dakota
Oil and Gas Division
Spill / Incident Report

Date/Time Reported : Mar 29 2014 / 15:32
State Agency person :
Responsible Party : Red River Company
Well Operator : HRC OPERATING, LLC
Date/Time of Incident : 3/28/2014 12:00:00 AM
NDIC File Number : 20552
Facility Number :
Well or Facility Name : MULLER 1-21-16H
Type of Incident : Valve/Piping Connection Leak
Field Name : CLIMAX
County : WILLIAMS
Section : 21
Township : 158
Range : 103
Quarter-Quarter :
Quarter :
Distance to nearest residence :
Distance to nearest water well :
Release Oil :
Release Brine : 5 Barrels
Release Other :
Recovered Oil :
Recovered Brine : 5 Barrels
Recovered Other :
Has/Will the incident be reported to the NRC? : No
Was release contained : Yes - Within Dike
Description of other released substance : NA

Immediate risk evaluation : None at this time
Followup Report Requested Y/N : Y

Industrial Commission of North Dakota
Oil and Gas Division
Spill / Incident Report

Date/Time Reported : Dec 10 2013 / 08:19
State Agency person :
Responsible Party : HRC Operating, LLC
Well Operator : HRC OPERATING, LLC
Date/Time of Incident : 12/9/2013 12:00:00 AM
NDIC File Number : 20552
Facility Number :
Well or Facility Name : MULLER 1-21-16H
Type of Incident : Pipeline Leak
Field Name : CLIMAX
County : WILLIAMS
Section : 21
Township : 158
Range : 103
Quarter-Quarter : SW
Quarter : SW
Distance to nearest residence : 1 Miles
Distance to nearest water well : 1 Miles
Release Oil : 1 barrels
Release Brine : 0 barrels
Release Other : 0 barrels
Recovered Oil : 1 barrels
Recovered Brine : 0 barrels
Recovered Other : 0 barrels
Has/Will the incident be reported to the NRC? : No
Was release contained : Yes - On Constructed Well Site
Description of other released substance :

Immediate risk evaluation : None all contained to pad
Followup Report Requested Y/N : N

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

JUN 2013
RECEIVED
ND OIL & GAS
DIVISION

Well File No.
20552
NDIC CTB No.
120552

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
Muller 1-21-16H	SWSW	21	158 N	103 W	Williams

Operator	Telephone Number	Field
HRC Operating, LLC	303-297-2028	Climax

Address	City	State	Zip Code
475 17th St, Ste 1500	Denver	CO	80202

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
Plains Marketing, L.P.	713-646-4100	100%	July 1, 2013

Principal Place of Business	City	State	Zip Code
PO Box 4648	Houston	TX	77210
Field Address	**City**	**State**	**Zip Code**
303 6th Ave NE	Belfield	ND	58622

Name of Transporter	Telephone Number	% Transported	Date Effective
Plains Marketing, L.P.	701-575-4349	100%	July 1, 2013

Address	City	State	Zip Code
303 6th Ave NE	Belfield	ND	58622

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments

I hereby swear or affirm that the information herein provided is true, complete and correct as determined from all available records. Date: June 12, 2013

Signature	Printed Name	Title
Connie Hval	Connie Hval	Production Analyst

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
Aleina Weisz	Aleina Weisz	Production Analyst

FOR STATE USE ONLY

Date Approved	JUL 09 2013
By	Evie Roberson
Title	Oil & Gas Production Analyst

NORTH DAKOTA
OIL AND GAS DIVISION

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director
Department of Mineral Resources
Lynn D. Helms - Director
North Dakota Industrial Commission
www.dmr.nd.gov/oilgas

July 2, 2013

HRC Operating, LLC
Jon Wright
475 Seventeenth Street, Suite 1500
Denver, CO 80202

RE: PRINCIPAL NAME CHANGE FROM
G3 OPERATING, LLC TO
HRC OPERATING, LLC
BOND NO. RLB0010990, RLB0007840, RLB0012118, RLB0010887, RLB00100005, RLB0015056, RLB0010988, RLB0010989
RLI INSURANCE COMPANY
327 WELLS

Dear Jon Wright:

This office is in receipt of your request to change the principal name of G3 Operating, LLC., to HRC Operating, LLC.

This letter will verify the principal name change effective July 1, 2013

Please feel free to contact this office if you should have any questions.

Sincerely,

Jeanette Bean
Administrative Assistant

Cc: Jason T. Kilpatrick
RLI Insurance CO.
8 Greenway Plaza, Suite 400
Houston, TX 77046

Industrial Commission of North Dakota
Oil and Gas Division
Spill / Incident Report

Date/Time Reported : Sep 15 2011 / 14:03
State Agency person :
Responsible Party :
Well Operator : G3 OPERATING, LLC
Date/Time of Incident : 9/13/2011 12:00:00 AM
NDIC File Number : 20552
Facility Number :
Well or Facility Name : MULLER 1-21-16H
Field Name : CLIMAX
County : WILLIAMS
Section : 21
Township : 158
Range : 103
Quarter-Quarter : SW
Quarter : SW
Distance to nearest residence : 1.5 Miles
Distance to nearest water well : 1.5 Miles
Release Oil : 1 barrels
Release Brine : 0 barrels
Release Other : 0 barrels
Recovered Oil : 1 barrels
Recovered Brine : 0 barrels
Recovered Other : 0 barrels
Has/Will the incident be reported to the NRC? : No
Was release contained : Yes - Within Dike
Description of other released substance :

Immediate risk evaluation : None.
Followup Report Requested Y/N : N

Weatherford LABORATORIES

SUMMARY OF ROUTINE CORE ANALYSES RESULTS

Vacuum Oven Dried at 180° F Net Confining Stress: 2,600 psi

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field

Williams County, North Dakota
File No.: CO-51887
Date: 10/14/2011

Core Number	Sample Number	Sample Depth, feet	Permeability, millidarcys		Porosity, percent		Grain Density, gm/cc	Fluid Saturations, percent		
			to Air	Klinkenberg	Ambient	NCS		Water	Oil	Total
1	1-1	9,580.50	0.0011	0.0003	0.9	0.9	2.70	96.5	1.5	98.1
1	1-2(F)	9,581.50	+		1.2		2.70	76.4	0.8	77.2
1	1-3	9,582.10	<0.0001		0.3	0.3	2.69			**
1	1-4(F)	9,583.50	+		0.9		2.69			**
1	1-5(F)	9,584.50	+		1.4		2.72	93.1	0.8	93.9
1	1-6(F)	9,585.50	+		1.3		2.70	63.1	1.5	64.6
1	1-7(F)	9,586.50	+		1.4		2.71	76.9	0.2	77.0
1	1-8	9,587.50	0.0017	0.0005	0.5	0.5	2.70			**
1	1-9(f)	9,588.50	0.0027	0.0009	0.9	0.9	2.71			**
1	1-10(f)	9,589.50	0.0074	0.0031	1.7	1.7	2.71			**
1	1-11(F)	9,590.50	+		0.6		2.69			**
1	1-12(F)	9,591.50	+		0.4		2.69			**
1	1-13(f)	9,592.50	0.079	0.051	2.6	2.6	2.72			**
1	1-14	9,593.50	0.0005	0.0001	1.6	1.6	2.71			**
1	1-15	9,594.35	0.072	0.039	1.3	1.2	2.72			**
1	1-16	9,595.75	<0.0001		1.2	1.2	2.71			**
1	1-17(f)	9,596.65	0.060	0.037	2.8	2.8	2.71			**
1	1-18(F)	9,597.15	+		2.8		2.74			**
1	1-19(f)	9,598.50	0.772	0.557	1.7	1.7	2.70			**
1	1-20	9,599.75	0.0095	0.0042	1.4	1.4	2.71			**
1	1-21(F)	9,600.35	+		4.3		2.36	11.5	73.3	84.8
1	1-23(F)	9,602.50	+		5.1		2.17	21.8	18.2	40.0
1	1-25(F)	9,604.50	+		3.5		2.13	29.1	63.1	92.1
1	1-27(F)	9,606.80	+		4.7		2.19	22.1	48.4	70.5
1	1-29(F)	9,608.70	+		4.4		2.13	24.5	32.5	57.0
1	1-30(F)	9,610.50	+		4.4		2.28	30.8	34.9	65.7
1	1-31(f)	9,611.50	0.336	0.233	7.2	7.1	2.76	73.9	6.6	80.5
1	1-32(f)	9,612.50	0.049	0.030	5.2	5.1	2.75	42.9	29.4	72.3
1	1-33(f)	9,613.40	0.018	0.0093	5.6	5.5	2.76	62.6	11.0	73.6
1	1-34(f)	9,614.50	0.321	0.220	7.4	7.4	2.74	81.1	0.2	81.4
1	1-35(f)	9,615.65	8.42	6.60	5.7	5.7	2.76	55.3	19.8	75.2
1	1-36(F)	9,616.45	+		7.3		2.75	71.4	7.2	78.5
1	1-37(f)	9,617.25	5.63	4.34	6.9	6.9	2.76	62.5	12.2	74.7
1	1-38	9,618.50	<0.0001		3.1	3.1	2.73	78.9	1.1	79.9
1	1-39(F)	9,619.20	+		7.4		2.75	80.1	0.1	80.2
1	1-40(F)	9,620.90	+		6.5		2.74	97.9	0.6	98.4
1	1-41(f)	9,621.55	0.121	0.082	5.6	5.6	2.75	69.3	6.6	75.9
1	1-42	9,622.50	0.0006	0.0001	6.0	5.9	2.75	65.4	11.7	77.1
1	1-43(f)	9,623.50	0.026	0.014	6.3	6.3	2.75	79.0	1.3	80.3
1	1-44	9,624.50	0.0029	0.0009	6.1	6.1	2.72	75.0	1.5	76.4
1	1-45	9,625.50	<0.0001		3.9	3.9	2.71	74.7	2.2	76.9
1	1-46	9,626.50	0.0005	0.0001	3.7	3.6	2.69	76.7	2.6	79.3
1	1-47(f)	9,627.50	0.438	0.308	8.5	8.4	2.72	72.3	1.0	73.3
1	1-49(f)	9,629.80	0.062	0.039	5.3	5.3	2.72	51.2	7.4	58.7

Weatherford LABORATORIES

SUMMARY OF ROUTINE CORE ANALYSES RESULTS

Vacuum Oven Dried at 180° F Net Confining Stress: 2,600 psi

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field

Williams County, North Dakota
File No.: CO-51887
Date: 10/14/2011

Core Number	Sample Number	Sample Depth, feet	Permeability, millidarcys		Porosity, percent		Grain Density, gm/cc	Fluid Saturations, percent		
			to Air	Klinkenberg	Ambient	NCS		Water	Oil	Total
1	1-50	9,630.50		<0.0001	4.0	4.0	2.72	77.5	4.3	81.8
1	1-51(f)	9,631.50	0.895	0.661	7.4	7.4	2.73	67.7	8.4	76.2
1	1-52	9,632.80	0.0081	0.0035	7.7	7.7	2.72	63.4	11.6	75.0
1	1-53	9,633.50	0.030	0.017	7.1	7.1	2.72	57.9	18.7	76.7
1	1-54	9,634.95		<0.0001	5.2	5.2	2.74	78.4	2.2	80.6
1	1-55(f)	9,635.95	0.107	0.072	5.9	5.8	2.73	56.5	13.6	70.2
1	1-57(f)	9,637.40	0.334	0.228	7.5	7.4	2.73	66.5	11.3	77.8
1	1-58	9,638.50	0.0056	0.0022	7.1	7.1	2.72	77.6	2.1	79.7
1	1-59	9,639.50	0.0049	0.0019	6.6	6.6	2.72	81.5	0.4	82.0
1	1-60	9,640.35	0.012	0.0054	6.9	6.9	2.72	77.9	0.1	78.0
1	1-61	9,641.45	0.0009	0.0002	6.7	6.7	2.73	71.3	4.3	75.6
1	1-62	9,642.50		<0.0001	6.3	6.2	2.73	86.0	1.0	87.0
1	1-63	9,643.50	0.0004	0.0001	6.4	6.3	2.73	84.5	0.9	85.4
1	1-64	9,644.50	0.0004	0.0001	4.9	4.9	2.73	79.3	4.9	84.2
1	1-65	9,645.60		<0.0001	5.6	5.6	2.71	96.9	0.4	97.4
1	1-66	9,646.50		<0.0001	5.7	5.6	2.72	87.8	0.5	88.2
1	1-67	9,647.50		<0.0001	5.2	5.2	2.72	85.3	0.6	85.9
1	1-68(f)	9,648.50	0.264	0.185	5.3	5.3	2.71	90.8	0.8	91.7
1	1-69	9,649.50		<0.0001	3.1	3.1	2.72	85.7	0.5	86.2
1	1-70(F)	9,650.75		+	5.5		2.73	85.1	0.2	85.3
1	1-71	9,651.50		<0.0001	4.5	4.5	2.73	90.2	0.3	90.5
1	1-72(F)	9,652.35		+	4.9		2.73	78.9	1.0	79.8
1	1-73(F)	9,653.50		+	5.9		2.75	66.3	8.3	74.6
1	1-74(F)	9,654.50		+	3.7		2.28	24.7	56.9	81.6
1	1-78(F)	9,658.50		+	6.4		2.29	10.2	27.4	37.6
1	1-79(F)	9,659.55		+	6.6		2.19	21.0	51.1	72.1
1	1-80(F)	9,660.50		+	8.9		2.31	17.5	32.8	50.4
1	1-82(F)	9,662.80		+	7.2		2.45	41.7	36.0	77.7
1	1-83(F)	9,663.50		+	5.5		2.75	19.9	64.0	83.9
1	1-83-1(F)	9,663.85		+	5.4		2.55	29.2	39.3	68.6
1	1-84(F)	9,664.10		+	5.6		2.37	28.5	45.3	73.8
1	1-84-1(F)	9,664.55		+	6.0		2.40	24.5	40.2	64.8
1	1-84-2(F)	9,664.90		+	6.8		2.66	65.3	13.8	79.1
1	1-85(F)	9,665.65		+	7.3		2.64	58.6	15.3	74.0
1	1-86(F)	9,666.00		+	5.9		2.62	69.3	19.6	88.9
1	1-87(F)	9,667.50		+	6.6		2.73	85.3	2.5	87.8
1	1-88	9,668.00	0.010	0.0045	7.9	7.9	2.85	85.4	2.8	88.2
1	1-88-1(F)	9,668.50		+	5.2		2.78	69.3	5.6	74.9
1	1-89(f)	9,669.30	0.644	0.458	8.0	8.0	2.81	68.2	12.2	80.4
1	1-90(F)	9,670.55		+	8.5		2.80	67.1	11.7	78.8
1	1-91	9,671.60	0.0041	0.0015	7.1	7.1	2.80	83.8	1.4	85.2
1	1-93(f)	9,673.25	0.325	0.223	6.2	6.1	2.77	73.8	0.4	74.2
1	1-94(f)	9,674.65	0.013	0.0060	3.6	3.6	2.80	77.4	0.5	77.9
1	1-95	9,675.05		<0.0001	3.1	3.1	2.79	55.1	17.4	72.5

Weatherford LABORATORIES

SUMMARY OF ROUTINE CORE ANALYSES RESULTS

Vacuum Oven Dried at 180° F Net Confining Stress: 2,600 psi

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field

Williams County, North Dakota
File No.: CO-51887
Date: 10/14/2011

Core Number	Sample Number	Sample Depth, feet	Permeability, millidarcys		Porosity, percent		Grain Density, gm/cc	Fluid Saturations, percent		
			to Air	Klinkenberg	Ambient	NCS		Water	Oil	Total
1	1-96	9,676.50	0.0046	0.0017	3.9	3.9	2.79	84.2	0.5	84.7
1	1-97(F)	9,677.55	+		6.4		2.75	97.6	0.6	98.2
1	1-98(F)	9,678.40	+		6.2		2.76	91.9	0.1	92.0
1	1-99	9,679.20	<0.0001		6.2	6.1	2.79	90.9	0.3	91.2
1	1-101	9,681.50	0.0005	0.0001	7.0	7.0	2.78	95.3	0.1	95.3
1	1-102	9,682.25	0.083	0.046	6.8	6.8	2.81	83.4	7.9	91.3
1	1-103	9,683.50	<0.0001		6.5	6.5	2.76	93.1	0.7	93.8
1	1-104	9,684.85	<0.0001		5.4	5.3	2.78	88.4	0.4	88.8
1	1-105	9,685.55	0.018	0.0090	6.9	6.8	2.79	95.4	0.3	95.7
1	1-106(F)	9,686.50	+		7.1		2.81	90.0	0.2	90.2
1	1-107(F)	9,687.95	+		6.8		2.78	86.6	0.1	86.7
1	1-108(f)	9,688.40	0.556	0.396	7.4	7.4	2.77	96.6	0.2	96.8
1	1-109(F)	9,689.90	+		7.8		2.76	94.4	0.3	94.7
1	1-110(F)	9,690.40	+		8.2		2.77	98.5	0.3	98.7
1	1-111(f)	9,691.50	0.0011	0.0003	7.1	7.0	2.76	89.5	0.1	89.6
1	1-112(F)	9,692.35	+		6.7		2.77	89.7	0.7	90.5
1	1-113(F)	9,693.20	+		6.6		2.77	94.3	0.1	94.4
1	1-114	9,694.65	0.0005	0.0001	6.3	6.3	2.77	94.1	0.2	94.3
1	1-115	9,695.50	<0.0001		6.1	6.1	2.79	94.4	0.2	94.6
1	1-116(F)	9,696.30	+		6.6		2.79	92.9	0.1	93.0
1	1-117(F)	9,697.50	+		6.5		2.77	93.6	0.8	94.4
1	1-118	9,698.30	0.0055	0.0022	5.8	5.8	2.80	89.6	0.4	90.0
1	1-119(F)	9,699.50	+		4.6		2.79	86.5	0.6	87.1
1	1-120(F)	9,700.80	+		6.4		2.79	85.1	0.4	85.6
1	1-121(F)	9,701.55	+		6.0		2.78	83.1	0.1	83.2
1	1-122	9,702.30	<0.0001		4.1	4.1	2.77	99.3	0.2	99.5
1	1-123(F)	9,703.40	+		5.7		2.79	82.2	0.1	82.3
1	1-124	9,704.45	<0.0001		4.5	4.5	2.81	88.5	0.6	89.1
1	1-125(F)	9,705.80	+		4.8		2.80	86.5	0.3	86.9
1	1-126(F)	9,706.50	+		5.1		2.79	96.5	0.2	96.7
1	1-128(F)	9,708.60	+		5.6		2.80	90.6	0.6	91.2
1	1-129(f)	9,709.30	1.86	1.36	6.0	6.0	2.79	94.5	0.5	94.9
1	1-130	9,710.70	0.443	0.333	6.3	6.2	2.79	87.8	0.3	88.1
1	1-131	9,711.50	0.0008	0.0002	6.0	6.0	2.79	86.0	2.8	88.8
1	1-132	9,712.40	<0.0001		5.4	5.4	2.79	90.5	0.5	91.1
1	1-133(F)	9,713.80	+		6.5		2.78	84.4	0.3	84.7
1	1-134(F)	9,714.30	+		6.7		2.78	89.9	0.5	90.3
1	1-135	9,715.55	0.050	0.030	5.9	5.9	2.79	88.1	0.6	88.7
1	1-136	9,716.65	<0.0001		5.9	5.8	2.79	89.9	0.5	90.4
1	1-137(F)	9,717.70	+		6.1		2.79	96.5	0.2	96.7
1	1-138	9,718.50	0.0018	0.0005	5.5	5.4	2.79	94.0	0.5	94.5
1	1-139	9,719.60	0.0099	0.0044	5.2	5.2	2.80	96.4	0.2	96.6
1	1-140(F)	9,720.55	+		5.2		2.77	90.7	0.1	90.9
1	1-141(f)	9,721.45	0.153	0.106	5.6	5.6	2.77	98.6	0.2	98.7

Weatherford LABORATORIES

SUMMARY OF ROUTINE CORE ANALYSES RESULTS

Vacuum Oven Dried at 180° F Net Confining Stress: 2,600 psi

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field

Williams County, North Dakota
File No.: CO-51887
Date: 10/14/2011

Core Number	Sample Number	Sample Depth, feet	Permeability, millidarcys		Porosity, percent		Grain Density, gm/cc	Fluid Saturations, percent		
			to Air	Klinkenberg	Ambient	NCS		Water	Oil	Total
1	1-142(F)	9,722.35	+		6.2		2.78	86.0	0.2	86.2
1	1-143	9,723.45	<0.0001		5.7	5.7	2.78	89.9	0.4	90.3
1	1-144(F)	9,724.65	+		6.6		2.76	95.9	0.1	96.0
1	1-145	9,725.30	<0.0001		4.9	4.9	2.80	83.6	1.4	85.0
1	1-146(f)	9,726.80	0.075	0.048	6.5	6.5	2.78	94.1	0.2	94.4
1	1-147	9,727.50	0.0010	0.0002	6.6	6.5	2.79	85.7	0.6	86.3
		Average values:	0.392	0.294	5.3	5.2	2.70	75.0	8.3	83.3

+ Indicates the sample is unsuitable for this type of measurement
** Indicates pore volume was insuffcient to report saturations
(f) Indicates the sample has a visible fracture
(F) Indicates the sample is fractured into multiple pieces

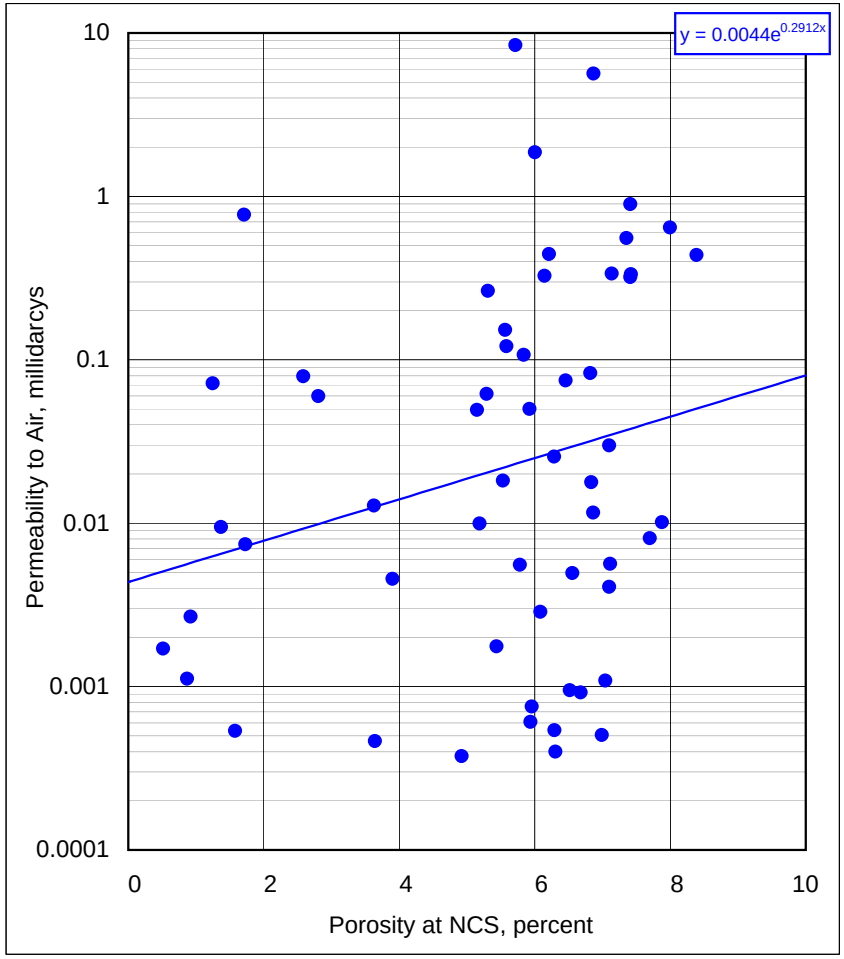
Weatherford LABORATORIES

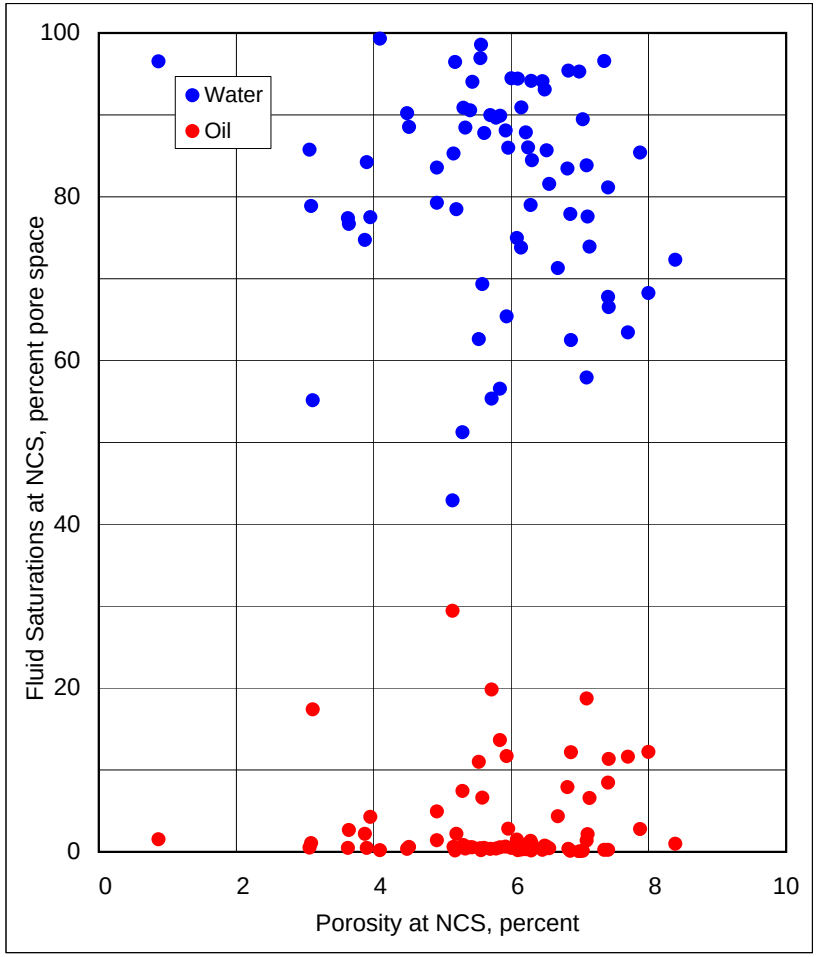
PERMEABILITY AND FLUID SATURATIONS VERSUS POROSITY

Vacuum Oven Dried at 180° F Net Confining Stress: 2,600 psi

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field

Williams County, North Dakota
File No.: CO-51887
Date: 10/14/2011





Weatherford LABORATORIES

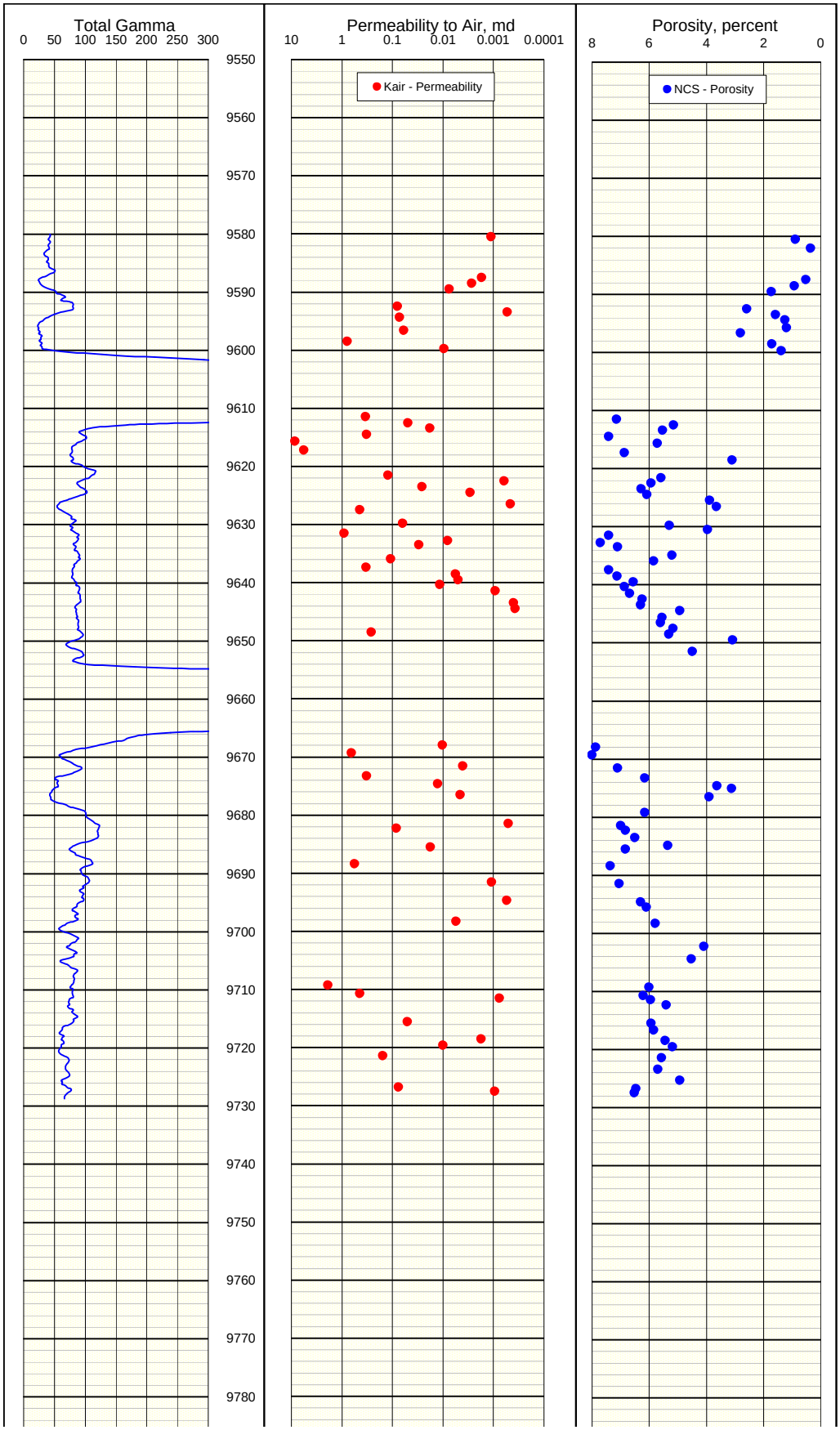
CORE GAMMA, PERMEABILITY, AND POROSITY PROFILE PLO

VERTICAL SCALE 5 inch:100 feet

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field

Williams County, North Dakota
File No.: CO-51887
Date: 10/14/2011

Core: 1 (9580.00' - 9728.70')



Weatherford LABORATORIES

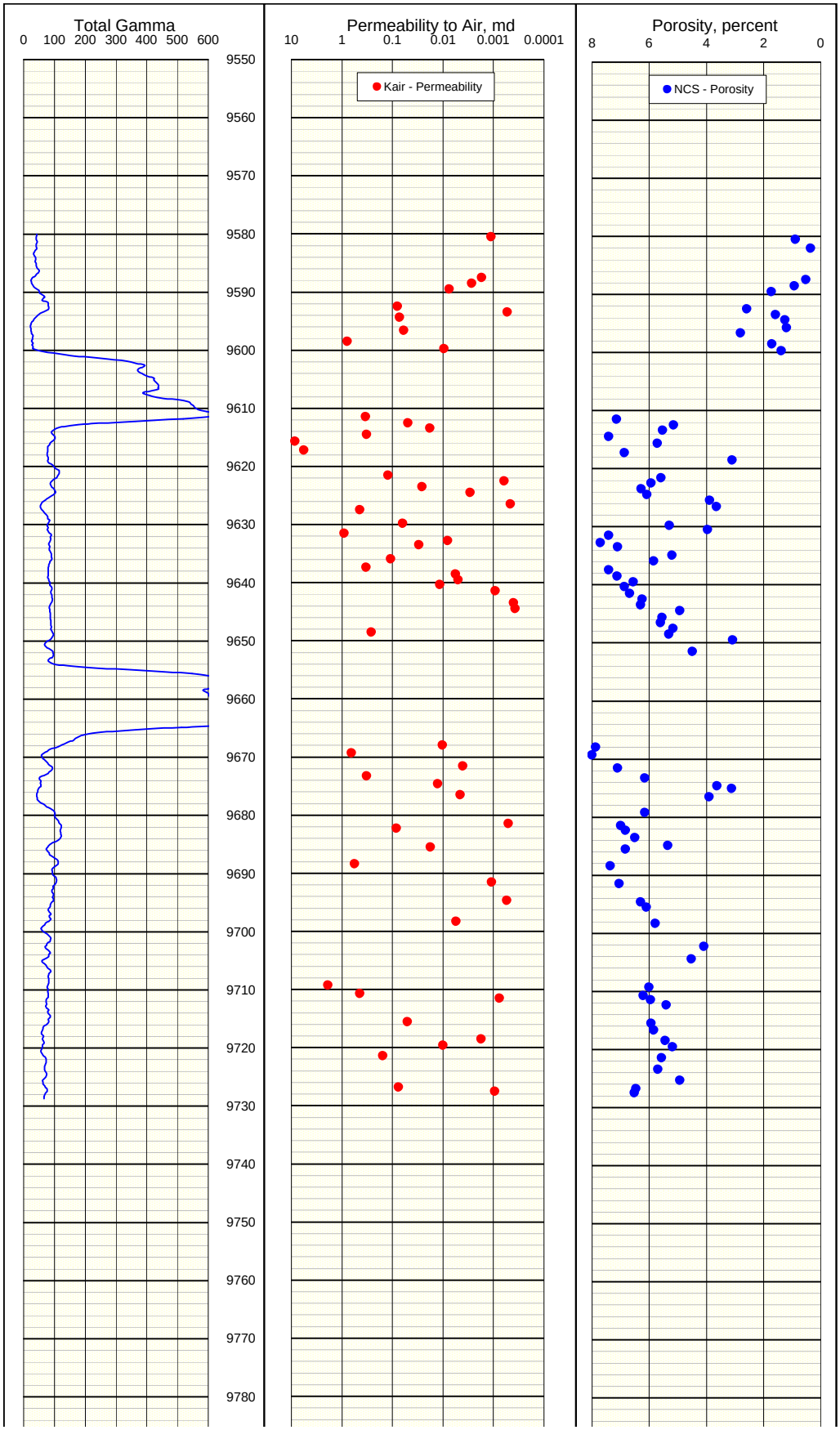
CORE GAMMA, PERMEABILITY, AND POROSITY PROFILE PLOT

VERTICAL SCALE 5 inch:100 feet

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field

Williams County, North Dakota
File No.: CO-51887
Date: 10/14/2011

Core: 1 (9580.00' - 9728.70')



Weatherford® LABORATORIES

G3 Operating, LLC
Muller No. 1-21-16H Well
Williams County, North Dakota
WFT Labs File No.: CO-51887
Logged by: Peter F. Purrazzella
Date: November 8, 2011

Panel 1 of 1

Williams County, North Dakota

Lithology:
- Sandstone
- Siltstone
- Shale
- Limestone
- Dolostone
- Chert
- Sandy
- Silty
- Calcareous
- Dolomitic
- Sideritic
- Siliceous
- Phosphatic
- Glauconitic

Contacts:
- Sharp Contact
- Gradational
- Erosional/Scoured
- R Rubble

Sedimentary Features/Structures:
- Planar Bedding
- Cross Bedding
- Ripple Cross-Stratification
- Small-Scale Trough Bedding
- Irregular Shaly Laminations/ Compaction Seams
- Soft-Sediment Deformation
- Burrows
- Graded Bed
- Fracures: Q=Quartz-Filled C=Calcite Ch=Chert D=Dolomite S=Sediment O=Open
- Fault
- Bored Hardground
- Fining Upward
- Coarsening Upward
- Microstylolite
- Irregular / Wavy Laminations
- Brecciated
- Carbonaceous Plant Fragment
- Carbonized Wood Fragment
- Root Trace
- Slickensides
- Caliche

Framework Grains:
- Peloid
- Oncoid
- Ooid
- Undifferentiated Grains
- Intraclast
- Agglutinated Foraminifera
- Fusulinid Foraminifera
- Worm Tube
- Calcareous Green Algae
- Chainglyphite Algae
- Calcareous Blue-Green Algae
- Calcareous Red Algae
- Pelecypod
- Gastropod
- Calcareous Sponge
- Sponge Spicules
- Thrombolitic Fabric
- Tubiphytes
- Stromatoporoid
- Echinoderm
- Bryozoan
- Brachiopod
- Rugose Coral
- Ostracod
- Trilobite
- Stromatolite

Accessory Minerals:
- Anhydrite Nodule
- Glauconite
- Pyrite
- Calcite Filled Vug

Analysis:
- T Brief Thin Section Description
- G General Thin Section Description
- D Detailed Thin Section Description
- X X-Ray Diffraction
- S Scanning Electron Microscopy

Depth (feet) 1" = 2' | Analyses | Gamma Ray Log (API) 0–300 | Gamma Ray Core (API) 0–300 | Resistivity (ohmm) MSFL/LLD 0.1–1000, MSRXO 0.1–1000, MSRXO 0.1–1000, MSFL 0.1–1000, MSFL 0.1–1000, MSFL 0.1–1000 | Thin Section Photographs | Lithology | Unit Description | Depositional Environment | Formation/Unit | Depth (feet) 1" = 2'

Core 1: 9980.0'–9739.2'

9980.0'–9977.5' – Limestone; intraclast; bioclast wackestone to mudstone; olive gray; irregular argillaceous/silty laminations; weathered intraclasts; oncoids; no visible pores.

9977.5'–9981.4' – Argillaceous, silty limestone; intraclast, bioclast wackestone to mudstone; olive gray and olive black to greenish gray; nodular fabric with irregular silt- and detrital clay-rich laminations; locally glauconitic(?); no visible pores.

9981.4'–9987.5' – Limestone to argillaceous, silty limestone; locally glauconitic; interbedded olive black mudstone and olive gray to light olive gray wackestone; mudstone beds are laminated with localized burrowing (particularly at bed tops); wackestones are dominantly burrowed with locally preserved laminations, as well as a few apparent burrowed foraminiferal intraclasts; intraclasts are weathered or contain weathering rinds; burrows appear to be dominantly *Zoophycos*; bioclasts include echinoderms (crinoids), ostracods, rugose coral, fenestrate bryozoans, and trilobites; disseminated replacement pyrite; no visible pores.

9987.5'–9989.9' – Argillaceous, silty limestone; possible localized dolomite replacement; glauconitic at base; bioclast wackestone; light olive gray and olive gray to olive black; nodular fabric with irregular silt- and detrital clay-rich laminations; burrowed; crinoids, trilobites, ostracods, gastropods, calcispheres, rugose coral; no visible pores.

9989.9'–9992.0' – Thinly interbedded limestone to slightly argillaceous limestone and silty, calcareous shale; olive black and brownish gray to brownish black; bioclast wackestone to mudstone; mineralized hardground at 9991.5'; shales laminated and burrowed, limestones dominantly burrowed; locally common *Zoophycos*; locally glauconitic; no visible pores.

9992.0'–9995.1' – Slightly argillaceous, silty, dolomitic limestone; bioclast wackestone, grades to packstone at top; burrowed with irregular argillaceous/silty/dolomitic laminations; brownish gray to dark brownish gray; locally glauconitic and/or phosphatic, including glauconite-replaced grains and phosphatic clasts; bioclasts are dominantly crinoid fragments with gastropods, ostracods, trilobites, rugose coral and tabulate coral detected; appears brecciated at 9993.6'; possible hardground at 9995.1'; patches of apparent phosphate replacement in upper part of unit; no visible pores.

9995.1'–9011.0' – Slightly dolomitic to dolomitic, silty shale; olive black; laminated with rare localized burrowing; very thin siliciclastic silt-rich laminations; also several more poorly defined laminations with concentrations of very small bioclasts; a large portion of which may be altered radiaxfibrous; thin-walled bivalves also detected; irregular, erosional upper contact; abundant disseminated organic fragments; pyrite as replacement of matrix, organic fragments, and bioclasts (including a possible pyrite-replaced brachiopod); pyrite is locally concentrated along grain-rich laminations; calcium phosphate(?) locally replaces bioclasts; rare pyrite- and/or phosphate-filled discontinuous fractures; one apparent pyrite-filled fracture is laterally offset; no visible pores.

9011.0'–9013.2' – Slightly argillaceous, dolomitic siltstone; grades to limestone (mesrophic?) at base; olive gray; burrowed with locally preserved grain-rich laminations; common bioclasts are dominantly brachiopods, including a few articulated, with echinoderms and bryozoans also detected; common replacement pyrite; no visible pores.

9013.2'–9015.8' – Thinly interbedded/interlaminated dolomitic siltstone to slightly argillaceous siltstone, and dolomitic, silty shale; calcareous at base; olive gray to light olive gray and olive black; siltstones are laminated to ripple cross-laminated and shales contain planar to irregular laminations; bedding extensively disturbed by burrowing, including common vertical burrows (including possible *Arenicolites*?) and possible *Planolites* and *Conichnus*?); scattered carbonaceous fragments; dolomite cement in siltstone laminations; no visible pores.

9015.8'–9018.8' – Slightly argillaceous, silty, necrophric(?) limestone; burrowed with grain-rich laminations at base; no visible pores.

9018.8'–9020.8' – Dolomitic, argillaceous silty shale to argillaceous siltstone; very thin matrix-poor siltstone laminations become more abundant towards base of unit; burrowed with variably preserved laminations and ripple cross-laminations in silts; disseminated small organic fragments; no visible pores.

9020.8'–9023.7' – Dolomitic, slightly argillaceous to argillaceous siltstone; medium dark to dark gray and olive gray; laminated and burrowed, with localized soft-sediment deformation (convoluted bed, contorted bedding); alternating finer, more argillaceous laminations and coarser, cleaner laminations; clean silt laminations are ripple cross-laminated; common carbonaceous fragments; disseminated replacement pyrite; no visible pores.

9023.7'–9026.6' – Slightly dolomitic to dolomitic, slightly calcareous to calcareous, slightly argillaceous, silty, very fine-grained sandstone to clean fine-grained sandstone; decreasing calcite content upward; olive gray to medium dark gray and dark yellowish brown; low-angle, possible bidirectional, cross-bedding at base; horizontal to low-angle, ripple cross-laminations disturbed by burrowing and minor soft-sediment deformation; localized organic-rich laminations; irregular argillaceous laminations; no visible pores.

9026.6'–9029.5' – Thinly interbedded to interlaminated dolomitic, silty, very fine-grained sandstone to sandy siltstone and dolomitic, slightly argillaceous siltstone; calcareous at base; small-scale bidirectional cross-bedding at base; ripple cross-laminations, and wavy to irregular argillaceous laminations; bedding disturbed by varying amounts of burrowing and slight soft-sediment deformation; a few microfaults; common small carbonaceous fragments; calcite cemented at base; disseminated replacement pyrite; no visible pores.

9029.5'–9031.3' – Slightly argillaceous, dolomitic siltstone; laminated; alternating finer, matrix-rich laminations and coarser matrix-poor to clean laminations; low-amplitude ripples in clean silts at top; abundant small carbonaceous fragments; no visible pores.

9031.3'–9034.2' – Thinly interbedded/interlaminated dolomitic, sandy siltstone and slightly argillaceous to argillaceous, dolomitic siltstone; dark yellowish brown and medium dark to olive gray; clean silts laminated to ripple cross-laminated; irregular argillaceous and/or organic-rich laminations; bedding disturbed by common to abundant, small, subhorizontal burrows; minor wavy small, bioclast(?) fragments; abundant small organic fragments; disseminated replacement pyrite; no visible pores.

9034.2'–9037.6' – Slightly argillaceous to argillaceous, dolomitic siltstone with thin beds/laminations of clean siltstone to very fine-grained sandstone; alternating coarser, matrix-poor and finer matrix-rich laminations; laminated to ripple cross-laminated with bedding disturbed by variable burrowing and localized soft-sediment deformation, including a possible small-scale slump; coarser siltbeard beds have sharp lower contacts, some with micro-loading structures; burrows include *Chondrites* and possible *Conichnus*?; scattered carbonaceous fragments; no visible pores.

9037.6'–9053.8' – Slightly calcareous to calcareous, dolomitic, slightly argillaceous to argillaceous siltstone; olive black to olive gray, becomes lighter upward (decreasing clay content?); extensively burrowed with vague traces of remnant bedding, including argillaceous laminations and clean silts; burrow types include *Chondrites*, *Teichichnus*, possible *Asterosoma*, possible *Cylindrichnus*, and elongate subhorizontal burrows (*Zoophycos*?); common bioclasts appear to be dominantly brachiopods (including articulated forms), with subordinate quantities of echinoderms, gastropods, and ostracods; rare possible sponge spicules at base; abundant disseminated carbonaceous fragments; no visible pores.

9053.8'–9067.5' – Silty shale with very thin siliciclastic silt-rich laminations; black to brownish black; laminated with localized burrowing; generally more grain-rich from 9064.0'–9065.5', with thicker silt-rich laminations and capped by a phosphatic bed with an erosive top and subsequently by a very thin, extremely organic-rich, dolomitic shale; a few small-scale slumps; common to abundant small, vertical burrows; pyrite is locally concentrated, and localized nodules are present; pyrite-replaced, and localized nodules are present; also concentrations of larger organic fragments; rare pyrite-replaced fusulinid foraminifera; abundant organic fragments, including localized elongate fragments; abundant pyrite replaces matrix, organic fragments, grain-rich laminations, and bioclasts; no visible pores.

9067.5'–9069.6' – Transgressive; thinly interbedded/interlaminated argillaceous, silty dolostone, slightly argillaceous, dolomitic siltstone; and mud chip-rich, sandy/silty dolostone to very fine-grained sandstone; brecciated at base.

9069.6'–9070.9' – Thinly interbedded silty dolostone and argillaceous, silty dolostone to dolomitic shale; pale yellowish brown and greenish gray; dolostones are often laminated to ripple cross-laminated; shales are burrowed with localized laminations; bioclasts are dominantly echinoderms, including crinoids and cysts; bioclasts also include brachiopods and gastropods; localized concentrations of dolostone intraclasts; locally brecciated; several small and one large desiccation crack in upper part of unit filled with small clasts; no visible pores.

9070.9'–9071.7' – Argillaceous, silty dolostone with a thin silty shale lamination near the base; mudstone; burrow mottled; a thin, discontinuous, apparent grain-rich lamination; locally brecciated, abundant replacement pyrite; no visible pores.

9071.7'–9074.7' – Sandy/Silty dolostone with thin beds, laminations, and drapes of silty, dolomitic shale to argillaceous dolostone; light yellowish brown and greenish gray; beds are offered to be grain-rich, with low-angle to horizontal bedding or ripple cross-laminations; relict subround grains locally discernible; bedding appears locally soft-sediment deformed; locally brecciated; desiccation cracks and concentrations of rip-up clasts in some beds; possible localized hydrocarbon staining; no visible pores.

9074.7'–9077.4' – Slightly argillaceous, silty dolostone to dolomitic siltstone; more siliciclastic-rich upward; lower part of unit appears brecciated with argillaceous sediment between dolostone clasts; possible localized burrowing and soft-sediment deformation; a few thin, coarser, grain-rich laminations in upper part of unit; localized concentrations of replacement pyrite in lower part of unit; no visible pores.

9077.4'–9083.0' – Argillaceous, silty, dolostone; grayish olive green; inferred texture is burrow mottled to burrowed in most of unit; rare preserved laminations; burrowed and soft-sediment deformed remnants of apparent more grain-rich laminations in upper part of unit; variable amounts of dolostone intraclasts; common replacement pyrite, including localized concentrations in burrows(?); no visible pores.

9083.0'–9085.6' – Silty, argillaceous dolostone; intraclast wackestone to packstone; grayish green to greenish gray, yellowish gray, and grayish yellow green; domi-nantly disturbed or chaotic fabric with localized traces of crude bedding; abundance of intraclasts generally decreases upward; variable amounts of relatively clean dolostone intraclasts (more grain-rich?) and argillaceous dolostone to dolomitic mudstone intraclasts (matrix-rich?); locally common replacement pyrite; no visible pores.

9085.6'–9087.7' – Silty, dolomitic shale to silty, argillaceous dolostone; intraclast wackestone; grayish olive green; variable amounts of clean dolostone and dolomitic mudstone intraclasts; no visible pores.

9087.7'–9091.1' – Silty, argillaceous dolostone to silty, dolomitic shale; dark olive gray; intraclast wackestone to packstone; disturbed fabric, with remnants of apparent grain-rich dolostone laminations in lower portion of unit; abundant variably sized and shaped intraclasts range from clean dolostone (grain-rich?) to silty mudstone (matrix-rich); no visible pores.

9091.1'–9097.6' – Silty, argillaceous dolostone; locally grades to silty, dolomitic shale; dominantly intraclast wackestone to packstone with minor mudstone; grayish red at base transitional upward to dark olive gray; dominantly disturbed fabric with localized remnants of bedding, including apparent clean dolostone laminations (grain-rich?); some of which appear rippled; variable proportions of relatively clean dolostone intraclasts (more grain-rich?) and argillaceous dolostone to dolomitic mudstone intraclasts (matrix-rich?); a few small-scale faults (slumps?); no visible pores.

9097.6'–9100.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone, silty, dolomitic shale, and dolomitic, sandy siltstone; clean dolomitic siltstone is ripple cross-laminated; argillaceous dolostones (matrix-rich) are dominantly intraclast wackestones to packstones; dolomitic shale to argillaceous dolostones contain disturbed (soft-sediment deformed) apparent grain-rich laminations; no visible pores.

9100.7'–9101.1' – Silty, dolomitic shale to silty, argillaceous dolostone (intraclast wackestone); grayish red; disturbed fabric with localized traces of bedding; variable amounts and sizes of intraclasts; no visible pores.

9101.1'–9103.3' – Thinly interbedded/interlaminated clean silty dolostone to dolomitic siltstone and silty, dolomitic shale; light olive gray to pale reddish gray and grayish olive green to dark gray; clean dolostone/siltstone laminations/beds are grain-rich and ripple cross-laminated or laminated; a few apparent graded beds; locally soft-sediment deformed (loading, small-scale fault, contorted bedding) or brecciated; very small sediment-filled desiccation cracks; no visible pores.

9103.3'–9105.2' – Thinly interbedded/interlaminated silty dolostone, silty, argillaceous dolostone to dolomitic shale, and silty, dolomitic shale; disturbed fabric with variably deformed remnants of bedding; localized brecciated; a few small-scale faults (slumps?); common to abundant variably sized dolostone intraclasts; resulting from fragmentation of grain-rich beds (dolostone) occurs in lower portion of unit; matrix-poor dolomite laminations/beds are inferred to be grain-rich and some display dominant ripple cross-stratification; subround relict grains are locally discernable in dolostone; argillaceous dolostones have intraclast wackestone to packstone textures; common to abundant dolostone and silty mudstone intraclasts have subround to angular shapes; no visible pores.

9105.2'–9124.3' – Silty argillaceous dolostone with a few very thin beds/laminations of silty, dolomitic shale; intraclast wackestone to packstone; locally preserved laminations are ripple cross-laminated; dominantly disturbed fabric with remnants of bedding; abundance of intraclasts generally decreases upward; variable proportions of relatively clean dolostone intraclasts (grain-rich?) and argillaceous dolostone to dolomitic mudstone intraclasts (matrix-rich?); common to abundant variably sized dolostone and silty shale to argillaceous dolostone clasts, with expand to elongate shales; concentrations of dolomitic clasts appear to represent disturbed/brecciated grain-rich laminations; matrix composed of varying proportions of detrital clay and replacement dolomite; no visible pores.

9124.3'–9125.6' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; matrix-poor dolostone laminations are inferred to be grain-rich and some are ripple cross-laminated; argillaceous dolostones have intraclast wackestone texture; no visible pores.

9125.6'–9126.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; matrix-poor dolostone laminations are inferred to be grain-rich and some are ripple cross-laminated; argillaceous dolostones have intraclast wackestone texture; no visible pores.

9126.7'–9129.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9129.2'–9129.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9129.7'–9132.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9132.7'–9134.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9134.2'–9137.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9137.5'–9139.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9139.2'–9139.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9139.7'–9142.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9142.7'–9144.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9144.2'–9147.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9147.5'–9149.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9149.2'–9152.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9152.7'–9154.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9154.2'–9157.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9157.5'–9159.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9159.2'–9162.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9162.7'–9164.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9164.2'–9167.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9167.5'–9169.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9169.2'–9172.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9172.7'–9174.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9174.2'–9175.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9175.2'–9178.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9178.7'–9179.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9179.2'–9182.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9182.7'–9184.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9184.2'–9187.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9187.5'–9189.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9189.2'–9192.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9192.7'–9194.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9194.2'–9197.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9197.5'–9199.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9199.2'–9202.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9202.7'–9204.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9204.2'–9207.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9207.5'–9209.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9209.2'–9212.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9212.7'–9214.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9214.2'–9217.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9217.5'–9219.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9219.2'–9222.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9222.7'–9224.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9224.2'–9227.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9227.5'–9229.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9229.2'–9232.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9232.7'–9234.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9234.2'–9237.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9237.5'–9239.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9239.2'–9242.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9242.7'–9244.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9244.2'–9247.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9247.5'–9249.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9249.2'–9252.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9252.7'–9254.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9254.2'–9257.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9257.5'–9259.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9259.2'–9262.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9262.7'–9264.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9264.2'–9267.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9267.5'–9269.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9269.2'–9272.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9272.7'–9274.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9274.2'–9277.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9277.5'–9279.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9279.2'–9282.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9282.7'–9284.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9284.2'–9287.5' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9287.5'–9289.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9289.2'–9292.7' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

9292.7'–9294.2' – Thinly interbedded/interlaminated silty, argillaceous dolostone to dolomitic shale and relatively clean dolostone; grayish red and dark grayish olive green; bedding variably deformed; local soft-sediment deformation (small-scale fault); possible burrowing at upper part of unit; no visible pores.

**9294.2'–9

Weatherford LABORATORIES

WEATHERFORD LABORATORIES
X-RAY DIFFRACTION
(WEIGHT %)

Client: G3 Operating, LLC
Well: Muller No. 1-21-16H
Area: Williams County, ND USA
Sample Type: Conventional Core

File No: CO-51887
Date: 08/26/11
Analyst: R. Schulze

Sample	Sample	CLAYS				CARBONATES				OTHER MINERALS							TOTALS		
Number	Depth (ft)	Chlorite	Kaolinite	Illite	Mx I/S*	Calcite	Fe-Dol	Dolomite	Siderite	Quartz	K-spar	Plag.	Pyrite	Apatite	Halite	Barite	Clays	Carb.	Other
1-5	9584.50	3	1	15	2	53	2	0	Tr	11	3	3	6	1	0	0	21	55	24
1-9	9588.50	1	Tr	9	1	78	2	0	Tr	6	2	1	0	0	0	0	11	80	9
1-15	9594.35	Tr	Tr	2	Tr	74	16	0	Tr	5	2	1	Tr	Tr	0	0	2	90	8
1-44	9624.50	1	Tr	5	Tr	8	25	0	Tr	51	5	3	1	0	1	0	6	33	61
1-45	9625.50	Tr	Tr	3	Tr	44	9	0	Tr	39	3	2	0	0	0	0	3	53	44
1-47	9627.50	1	Tr	8	Tr	1	25	0	Tr	49	9	6	0	0	1	0	9	26	65
1-49S	9629.00	1	Tr	5	Tr	2	24	0	Tr	51	7	8	1	0	1	0	6	26	68
1-50	9630.50	1	Tr	8	1	19	15	0	Tr	41	6	6	3	0	Tr	0	10	34	56
1-51	9631.50	1	Tr	11	1	2	24	0	Tr	44	8	6	2	0	1	0	13	26	61
1-57	9637.50	1	Tr	10	Tr	2	24	0	Tr	42	10	8	2	0	1	0	11	26	63
1-60	9640.35	1	Tr	11	Tr	4	24	0	Tr	41	11	6	1	0	1	0	12	28	60
1-62	9642.50	1	Tr	11	Tr	6	0	21	Tr	41	9	7	2	0	2	0	12	27	61
1-64	9644.50	1	Tr	11	1	14	0	18	Tr	38	9	6	2	0	Tr	0	13	32	55
1-88	9668.00	2	Tr	16	1	Tr	0	42	Tr	19	11	4	4	0	1	0	19	42	39
1-89	9669.30	2	Tr	13	1	0	0	52	Tr	17	9	4	1	0	1	0	16	52	32
1-91	9671.60	2	Tr	14	1	0	0	53	Tr	17	7	4	1	0	1	0	17	53	30
1-93	9673.50	1	Tr	12	1	0	0	43	Tr	26	10	3	3	0	1	0	14	43	43
	AVERAGE	1	Tr	10	Tr	18	11	14	Tr	32	7	4	2	Tr	1	0	11	43	46

* Ordered interstratified mixed-layer illite/smectite; Approximately 10-15% expandable interlayers

Weatherford
LABORATORIES

ROCK MECHANICS TESTING & ANALYSES
MULLER #1-21-16H
WILLIAMS COUNTY, ND
G3 OPERATING, LLC

ROCK MECHANICS FINAL REPORT

(Triaxial Compressive Tests)

(Acoustic Velocities)

(Mohr-Coulomb Failure Analysis)

(Proppant Embedment Tests)

WFT Labs CO-51887

Performed by:

Weatherford Laboratories
8845 Fallbrook Drive
Houston, TX 77064

Ohmyoung Kwon, Ph.D.

Report Issued:

August 19, 2011

The interpretations or opinions expressed represent the best judgment of Weatherford Laboratories and assumes no responsibility and makes no warranty or representations, as to the productivity, proper operation, or profitableness of any oil, gas or any other mineral well. These analyses, opinions or interpretations are based on observations and materials supplied by the client for whom this report is made.

Procedures for Triaxial Compressive Strength Test

The general procedures for triaxial compressive test are summarized in the following:

1) A right cylindrical plug is cut from the sample core and their ends ground parallel each other within 0.001 inch. Physical dimensions and weight of the specimen are recorded.

2) The specimen is then placed between two platens and a heat-shrink jacket is placed over the specimen.

3) Axial strain and radial strain devices are mounted in the platens and on the lateral surface of the specimen, respectively.

4) The specimen assembly is placed into the pressure vessel and the pressure vessel is filled with hydraulic oil.

5) Confining pressure is increased to the desired hydrostatic testing pressure.

6) Measure ultrasonic velocities at the hydrostatic confining pressure.

7) Specimen assembly is brought into the contact with a loading piston that allows application of axial load.

8) Increase axial load at a constant displacement rate until the specimen fails or axial strain reaches a desired amount of strain while confining pressure is held constant.

9) Reduce axial stress to the initial hydrostatic condition after sample fails or reaches a desired axial strain.

10) Reduce confining pressure to zero and disassemble sample.

Procedures for Proppant Embedment Test

The general procedures for proppant embedment test are summarized in the following:

1) A 1-inch diameter horizontal plug is cut to about 0.4-inch long disk and its end surfaces ground flat and parallel each other.

2) Sample is saturated with desired fluid for 30 minutes.

3) The disk sample is placed inside of proppant embedment cell and proppants of a given concentration (lb/ft^2) are spread on top of the sample.

4) The piston is placed over the proppants.

5) The proppant embedment cell assembly is placed between the platens fitted with LVDTs which measure axial displacement.

6) Apply axial load to the sample and proppants at a constant rate until axial stress reaches to pre-set value.

7) Reduce axial load after the axial stress is reached to the pre-set value and disassemble proppant embedment cell.

8) Proppant embedment are determined from the axial displacement of the piston after correcting proppant compaction which is measured indepently with proppants only.

SUMMARY OF TRIAXIAL COMPRESSIVE TESTS

tested under as-is condition

G 3 Operating, LLC **Williams County, ND**
Muller #1-21-16H

Sample No.	Depth (ft)	Confining Pressure (psi)	Compressive Strength (psi)	Static Young's Modulus ($x10^6$ psi)	Static Poisson's Ratio
1-48RMV	9628.64	2600	27598	3.54	0.30
1-49RMV-3	9629.48	2600	38719	4.92	0.26
1-52RMV	9632.40	2600	29330	3.85	0.28
1-54RMV	9634.60	2600	33067	5.34	0.33
1-56RMV	9636.30	2600	28768	3.94	0.36
1-91RMV	9672.09	2600	22482	4.45	0.32
1-102RMV	9682.85	2600	27946	3.72	0.19

SUMMARY OF ULTRASONIC VELOCITIES AND DYNAMIC ELASTIC PARAMETERS

tested under as-is condition

G 3 Operating, LLC
Muller #1-21-16H

Williams County, ND

Sample No.	Depth (ft)	Confining Pressure (psi)	Bulk Density (g/cc)	Ultrasonic Wave Velocity				Dynamic Elastic Parameter			
				Compressional		Shear		Young's Modulus ($x10^6$ psi)	Poisson's Ratio	Bulk Modulus ($x10^6$ psi)	Shear Modulus ($x10^6$ psi)
				ft/sec	µsec/ft	ft/sec	µsec/ft				
1-48RMV	9628.64	2600	2.54	14697	68.04	9060	110.38	6.71	0.19	3.65	2.81
1-49RMV-3	9629.48	2600	2.57	15429	64.81	9626	103.88	7.58	0.18	3.96	3.21
1-52RMV	9632.40	2600	2.57	15285	65.43	9223	108.43	7.16	0.21	4.17	2.95
1-54RMV	9634.60	2600	2.64	16278	61.43	9708	103.00	8.20	0.22	4.95	3.35
1-56RMV	9636.30	2600	2.60	15200	65.79	9176	108.98	7.16	0.21	4.16	2.95
1-91RMV	9672.09	2600	2.74	16996	58.84	10165	98.38	9.32	0.22	5.58	3.81
1-102RMV	9682.85	2600	2.62	15551	64.31	9065	110.32	7.22	0.24	4.68	2.91

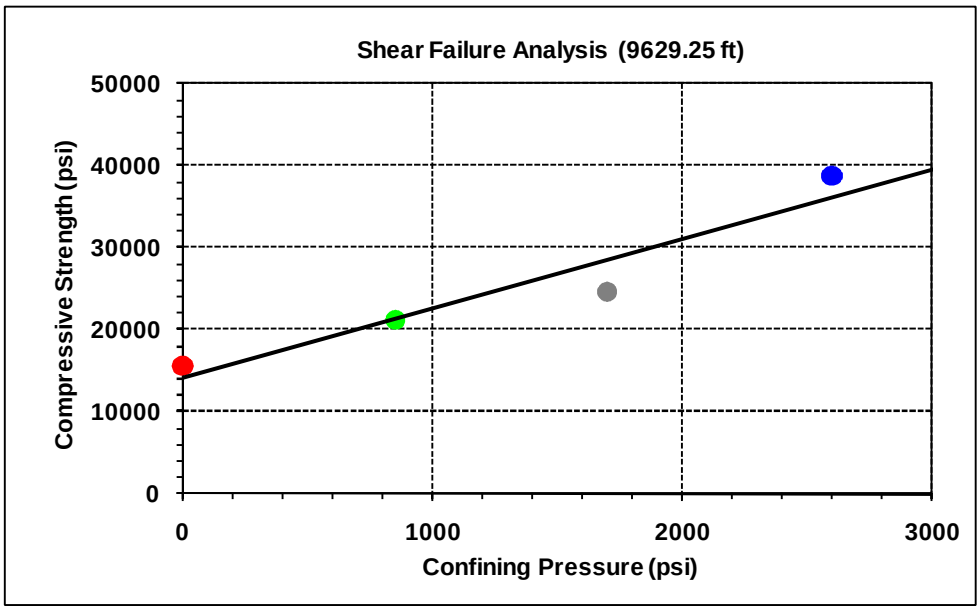
WFT Labs CO-51887

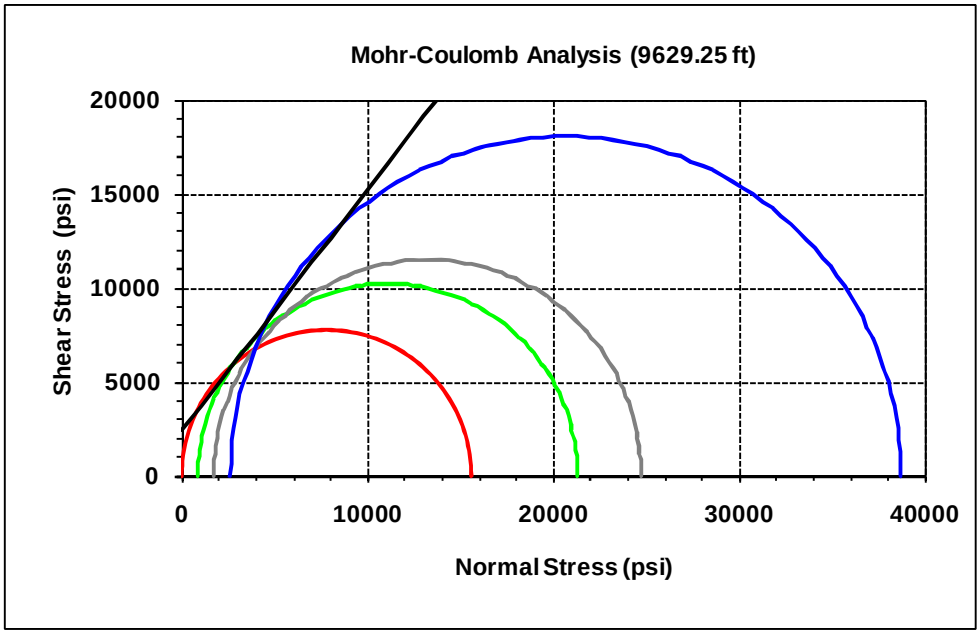
Result of Mohr-Coulomb Failure Analysis

G3 Operating
Muller #1-21-16H

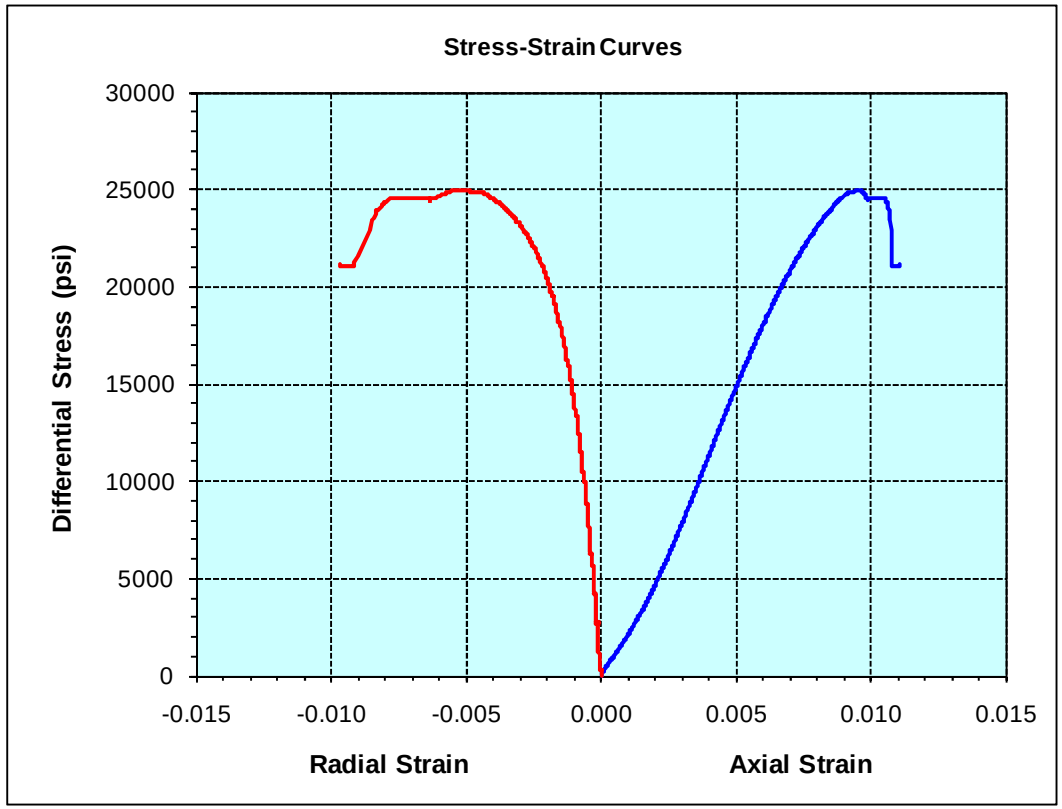
Williams County, ND

Sample No.	Depth (ft)	Confining Pressure Pc = σ_3 (psi)	Differential Stress $\sigma_1 - \sigma_3$ (psi)	Compressive Strength σ_1 (psi)	Slope on σ_1 vs Pc	Unconfined Compressive Strength (psi)	Angle of Internal Friction (deg)	Coeff. Of Internal Friction	Cohesion (psi)
1-49RMV-2	9629.25	0	15566	15566	8.46	14178	52.1	1.28	2437
1-49RMV-4	9629.48	850	20440	21290					
1-49RMV-1	9629.25	1700	23003	24703					
1-49RMV-3	9629.48	2600	36119	38719					





Result of Triaxial Compressive Test



Company	G3 Operating
Project Title	Muller
WFT Project No.	CO-51887

Sample No.	1-48RMV
Depth (ft)	9628.64
Saturation State	As-is
Confining Pressure (psi)	2600
Bulk Density (g/cc)	2.54
Compressive Strength (psi)	27598
Young's Modulus ($x10^6$ psi)	3.54
Poisson's Ratio	0.30

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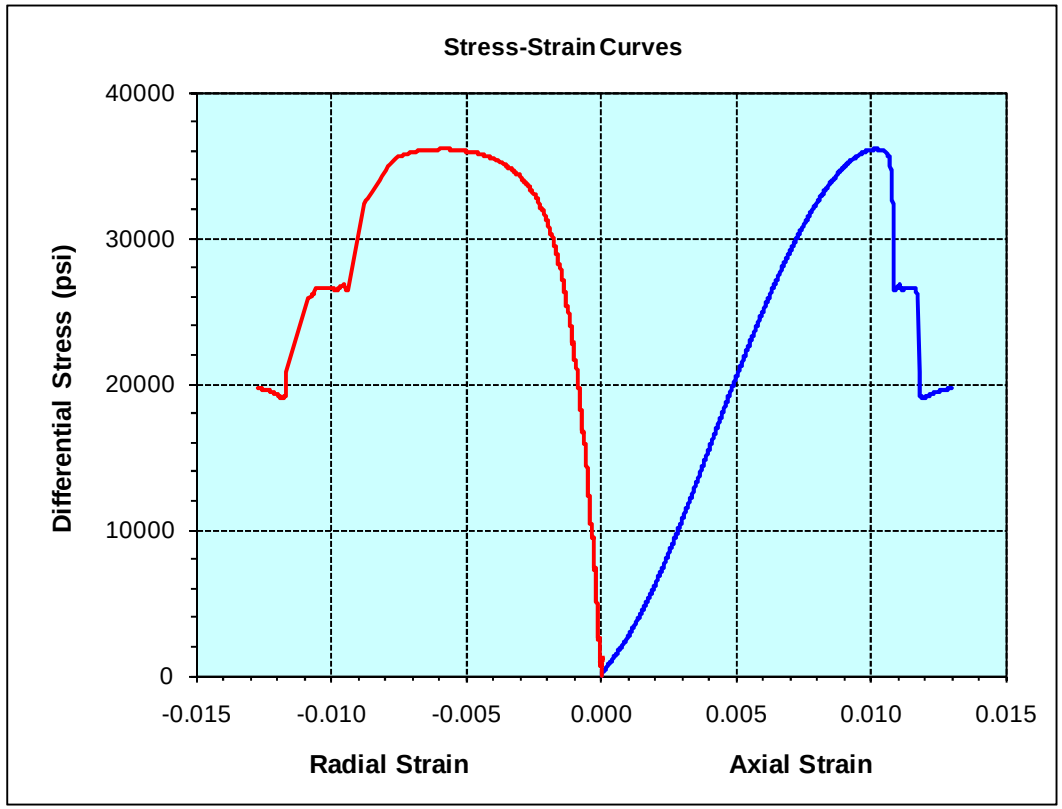
Result of Triaxial Compressive Test



Company	G3 Operating
Project Title	Muller
WFT Project No.	CO-51887

Sample No.	1-49RMV-3
Depth (ft)	9629.48
Saturation State	As-is
Confining Pressure (psi)	2600
Bulk Density (g/cc)	2.57
Compressive Strength (psi)	38719
Young's Modulus ($x10^6$ psi)	4.92
Poisson's Ratio	0.26

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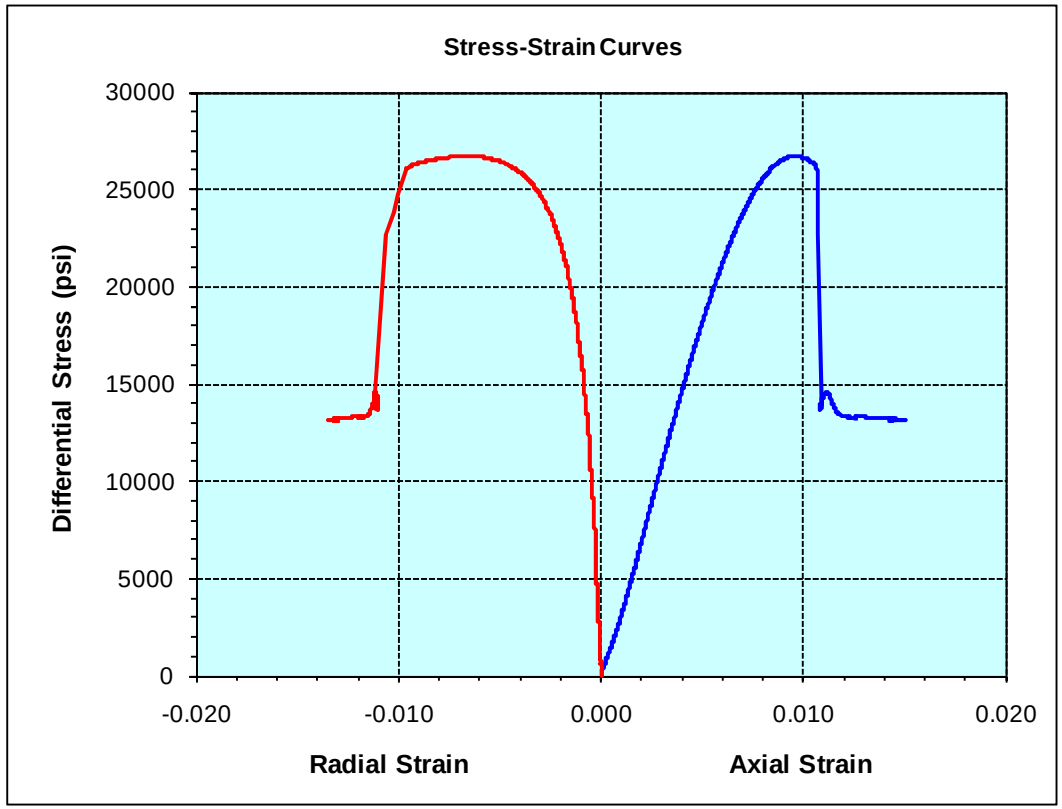
Result of Triaxial Compressive Test



Company	G3 Operating
Project Title	Muller
WFT Project No.	CO-51887

Sample No.	1-52RMV
Depth (ft)	9632.40
Saturation State	As-is
Confining Pressure (psi)	2600
Bulk Density (g/cc)	2.57
Compressive Strength (psi)	29330
Young's Modulus ($x10^6$ psi)	3.85
Poisson's Ratio	0.28

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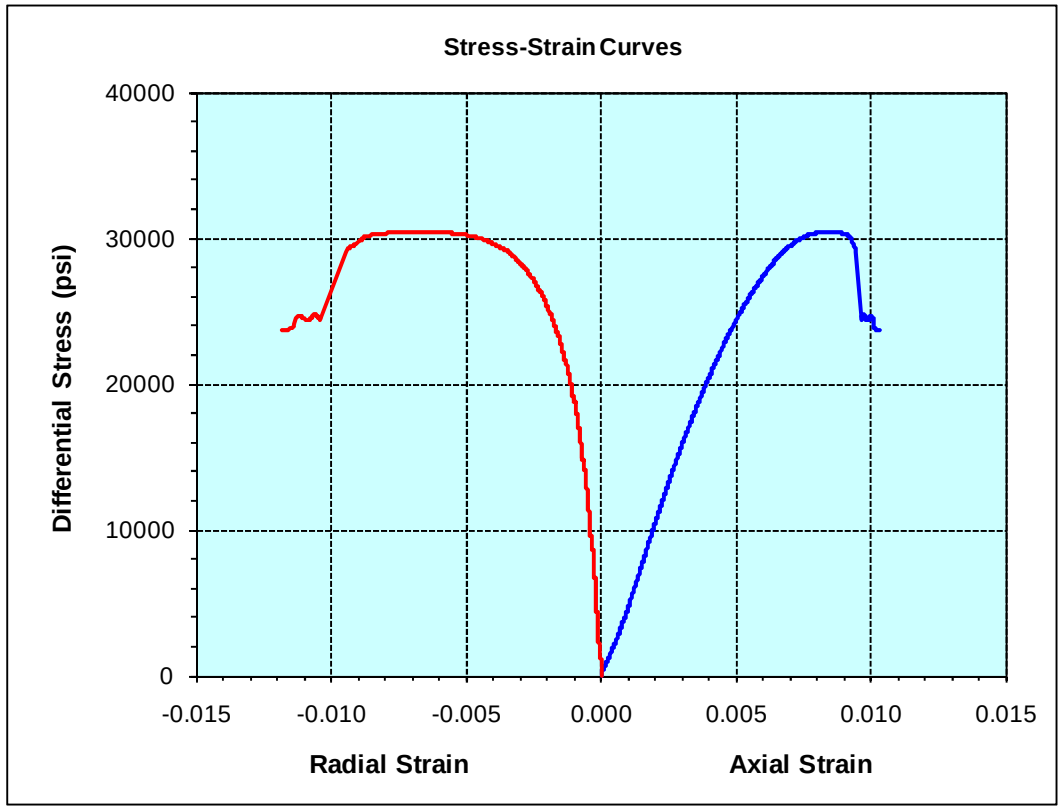
Result of Triaxial Compressive Test



Company	G3 Operating
Project Title	Muller
WFT Project No.	CO-51887

Sample No.	1-54RMV
Depth (ft)	9634.60
Saturation State	As-is
Confining Pressure (psi)	2600
Bulk Density (g/cc)	2.64
Compressive Strength (psi)	33067
Young's Modulus ($x10^6$ psi)	5.34
Poisson's Ratio	0.33

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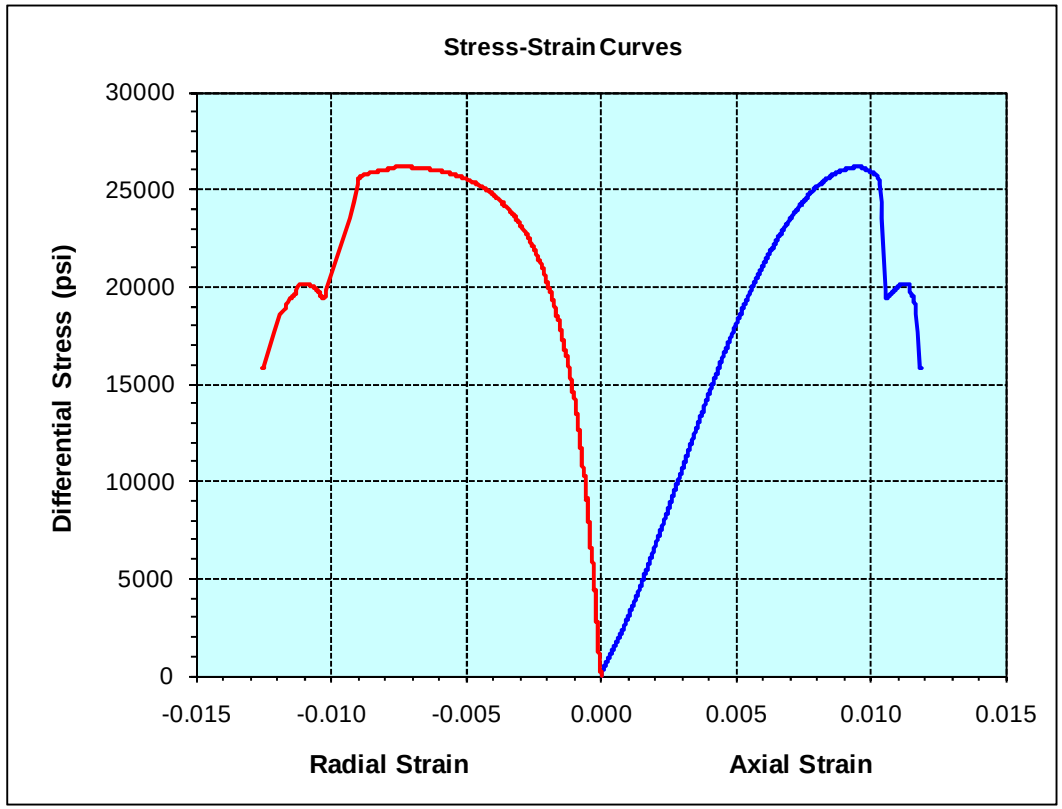
Result of Triaxial Compressive Test

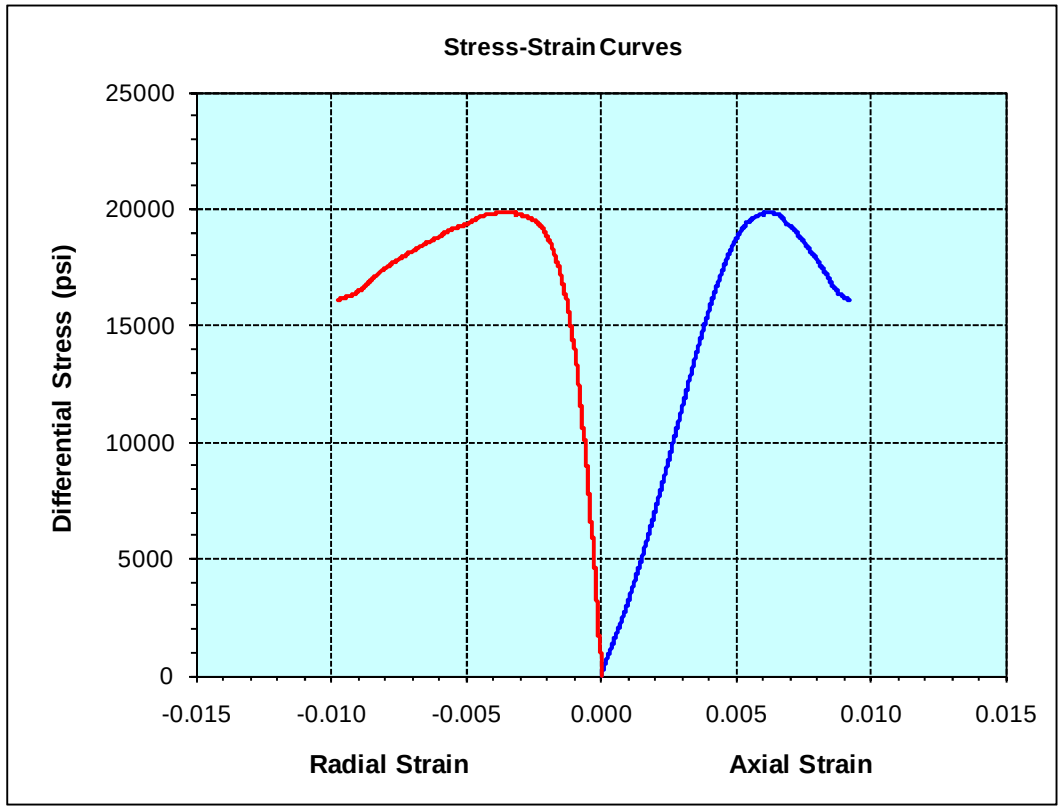


Company	G3 Operating
Project Title	Muller
WFT Project No.	CO-51887

Sample No.	1-56RMV
Depth (ft)	9636.30
Saturation State	As-is
Confining Pressure (psi)	2600
Bulk Density (g/cc)	2.60
Compressive Strength (psi)	28768
Young's Modulus ($x10^6$ psi)	3.94
Poisson's Ratio	0.36

Weatherford LABORATORIES

Result of Triaxial Compressive Test



Company	G3 Operating
Project Title	Muller
WFT Project No.	CO-51887

Sample No.	1-91RMV
Depth (ft)	9672.09
Saturation State	As-is
Confining Pressure (psi)	2600
Bulk Density (g/cc)	2.74
Compressive Strength (psi)	22482
Young's Modulus ($x10^6$ psi)	4.45
Poisson's Ratio	0.32

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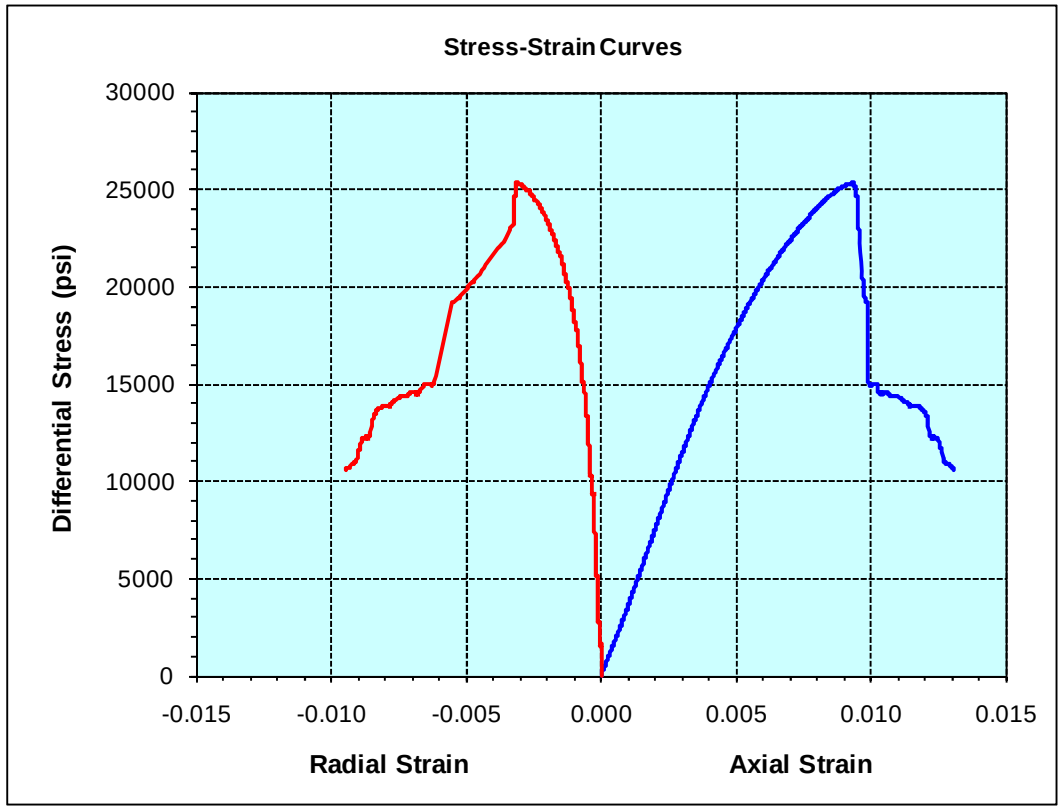
Result of Triaxial Compressive Test



Company	G3 Operating
Project Title	Muller
WFT Project No.	CO-51887

Sample No.	1-102RMV
Depth (ft)	9682.85
Saturation State	As-is
Confining Pressure (psi)	2600
Bulk Density (g/cc)	2.62
Compressive Strength (psi)	27946
Young's Modulus ($x10^6$ psi)	3.72
Poisson's Ratio	0.19

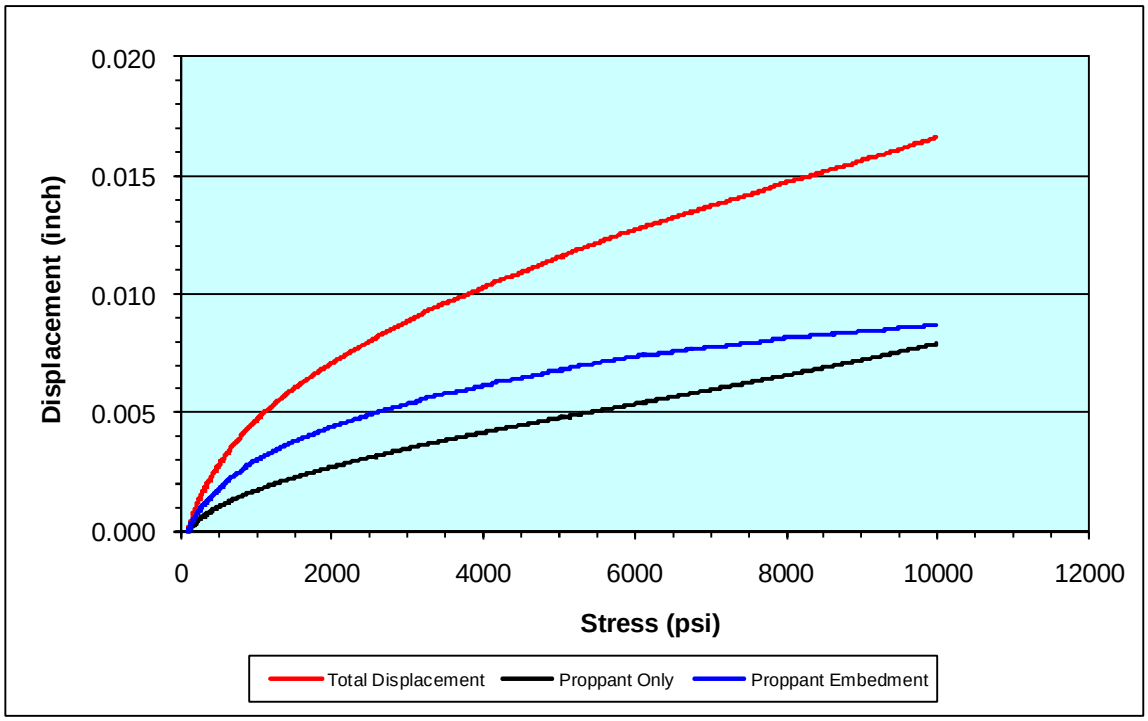
Weatherford LABORATORIES

WFT Labs CO-51887

Result of Proppant Embedment Test

G 3 Operating, LLC
Muller #1-21-16H

Embedment on one face



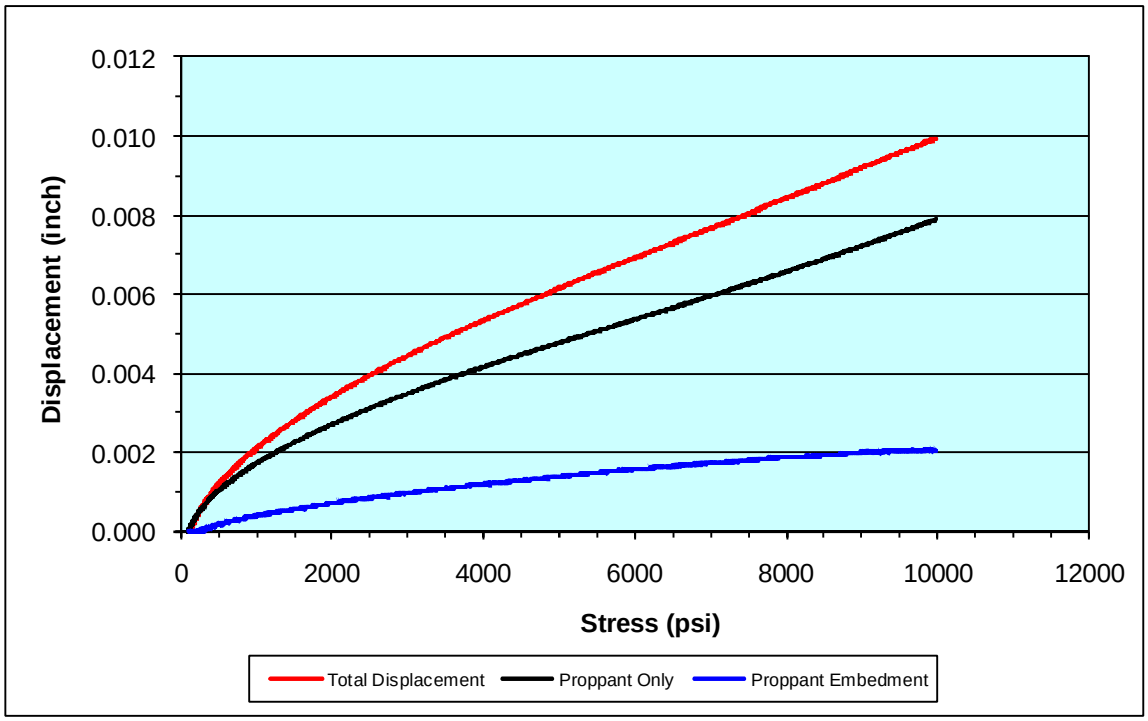
Sample No.	1-49RMH	Size	20/40
Depth (ft)	9629.52	Concentration (g/in^2)	2.0
Proppant Type	Sinterball	Saturation	2% KCl

WFT Labs CO-51887

Result of Proppant Embedment Test

G 3 Operating, LLC
Muller #1-21-16H

Embedment on one face



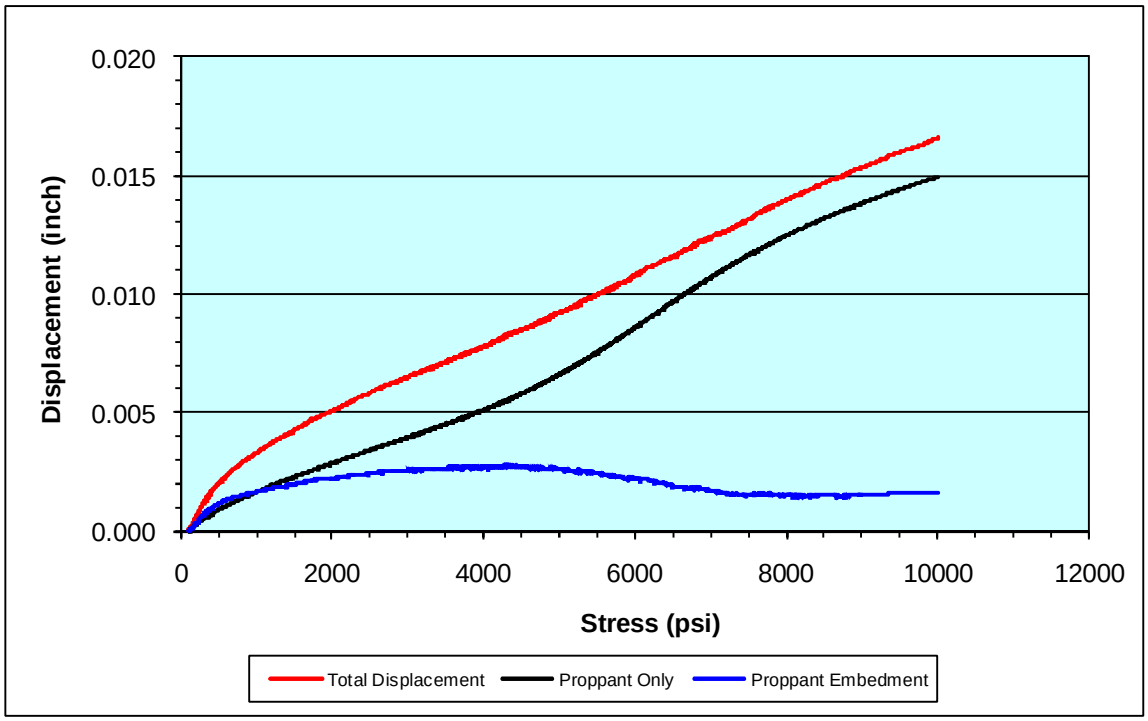
Sample No.	1-52RMH-1	Size	20/40
Depth (ft)	9632.08	Concentration (g/in^2)	2.0
Proppant Type	Sinterball	Saturation	2% KCl

WFT Labs CO-51887

Result of Proppant Embedment Test

G 3 Operating, LLC
Muller #1-21-16H

Embedment on one face



Sample No.	1-52RMH-2	Size	20/40
Depth (ft)	9632.08	Concentration (g/in^2)	2.0
Proppant Type	White Sand	Saturation	2% KCl

Formation Factor Summary

2-Terminal Method, 1 kHz, 77°F

Net Confining Stress: 2600 psi

INTERIM FF

Client: G3 Operating

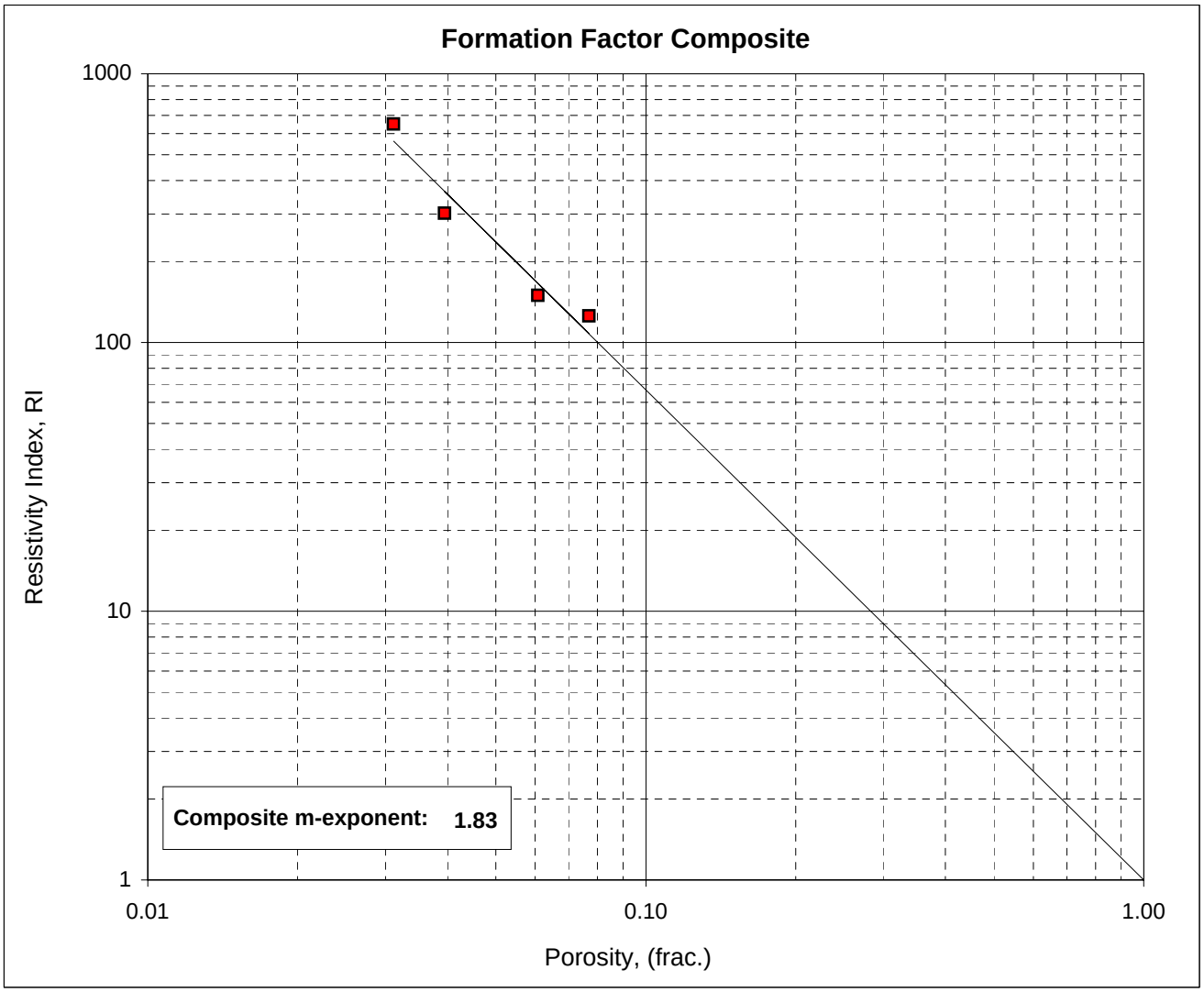
Well: Muller No. 1-21-16H

Project No.: CO-51887

Saturant: Synthetic Formation Brine

Rw, ohm-m @ 77°F: 0.0405

Sample No.	Depth (ft)	Porosity Φ (frac.)	Ka (mD)	FF (Ro/Rw)	Ro ohm-m	m-Exponent m
1-44	9624.50	0.061	0.0029	149.2	6.044	1.79
1-50	9630.50	0.040	0.0001	302.9	12.27	1.77
1-52	9632.80	0.077	0.0081	125.5	5.081	1.88
1-95	9675.05	0.031	0.0002	648.5	26.27	1.87
					Composite ($y = x^{-m}$):	1.83



G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9627.50 Feet
Sample Number: 1-47

Plate 1

Klink. Perm. (2600 psi): 0.308 md
Porosity (2600 psi): 8.4%
Grain Density: 2.72 gm/cc

Lithology: Dolomitic, silty, very fine-grained sandstone to argillaceous, silty/sandy dolostone

Texture: Obscured by extensive dolomite replacement; alternating clean dolomitic sandstone (rows A-G, photo A; rows A-F, photo B) and irregular, matrix-rich, argillaceous dolostone (H1 to J-K15, photo A; rows H-K, photo B) laminations disturbed by burrowing; a few possible remnant ripple forms

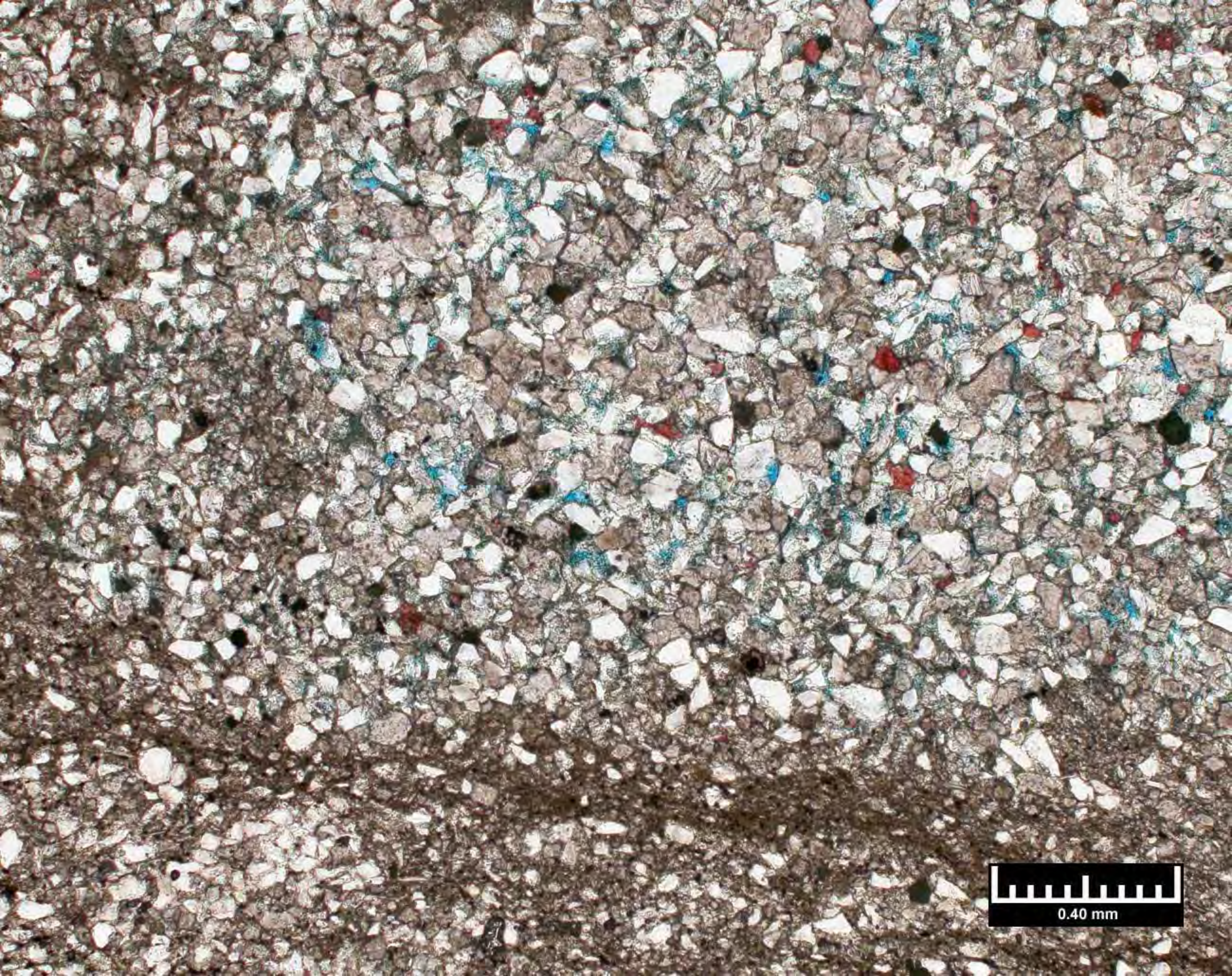
Grains: Abundant angular to subround siliciclastic grains range from silt to fine sand size (up to 0.19 mm); estimated average grain size = 0.08 mm; monocrystalline quartz (C12, photo B) > feldspar (potassium feldspar > plagioclase; A-B13, photo B) > muscovite, polycrystalline quartz > biotite/altered biotite, glauconite, heavy minerals (zircon, titanium oxide, tourmaline), schist fragments(?); very sparsely scattered, very small, abraded calcareous bioclast(?) fragments (B-C2.5, photo B); trace phosphatic fragments; sparsely scattered small carbonaceous fragments

Matrix: Depositional matrix appears to irregularly distributed in the sample, and appears to support grains in some argillaceous laminations; composed of varying amounts of remnant detrital clay (brown; J10, photo A; K10, photo B) and very fine to medium crystalline replacement dolomite (light gray; ~~H~~2,J-K9.5, photo B); XRD analysis has detected 9 wt.% total clay, dominantly composed illite (8 wt.%) with a minor amount of chlorite (1 wt.%) and trace quantities of mixed-layer illite/smectite and kaolinite

Cements and Replacement Minerals: Abundant very fine to medium crystalline, euhedral to anhedral dolomite is an extensive replacement of argillaceous (and precursor carbonate?) matrix, and may have replaced precursor carbonate grains and occurs as intergranular cement in grain-rich laminations (light gray; C10.5,D6, photo B); authigenic clay has formed thin grain coatings in matrix-poor laminations or areas (A4.5, photo B), and occurs as erratically distributed pore-filling cement (B9.5, photo B); quartz overgrowth cement occurs as variably developed partial rims that reduce or fill intergranular pores in matrix-poor areas (D1,E-F2, photo B); a very minor amount of feldspar overgrowths also observed; a very minor amount of calcite has formed in some intercrystalline areas and appears to have replaced some siliciclastic grains; common disseminated small crystals and small crystal aggregates of pyrite have partially replaced matrix and grains, and carbonaceous fragments (black; A7.5,C-D5.5, photo B)

Pore System: Dominantly erratically distributed intergranular/intercrystalline pores that occur in matrix-poor laminations/areas (B8, photo A; F2.5, photo B); a subordinate amount of secondary pores have resulted from partial to complete grain dissolution (including feldspars; D13, photo B); micropores associated with authigenic clays and altered/partially leached grains significantly contribute to the pore volume

Magnification: A: 50X B: 200X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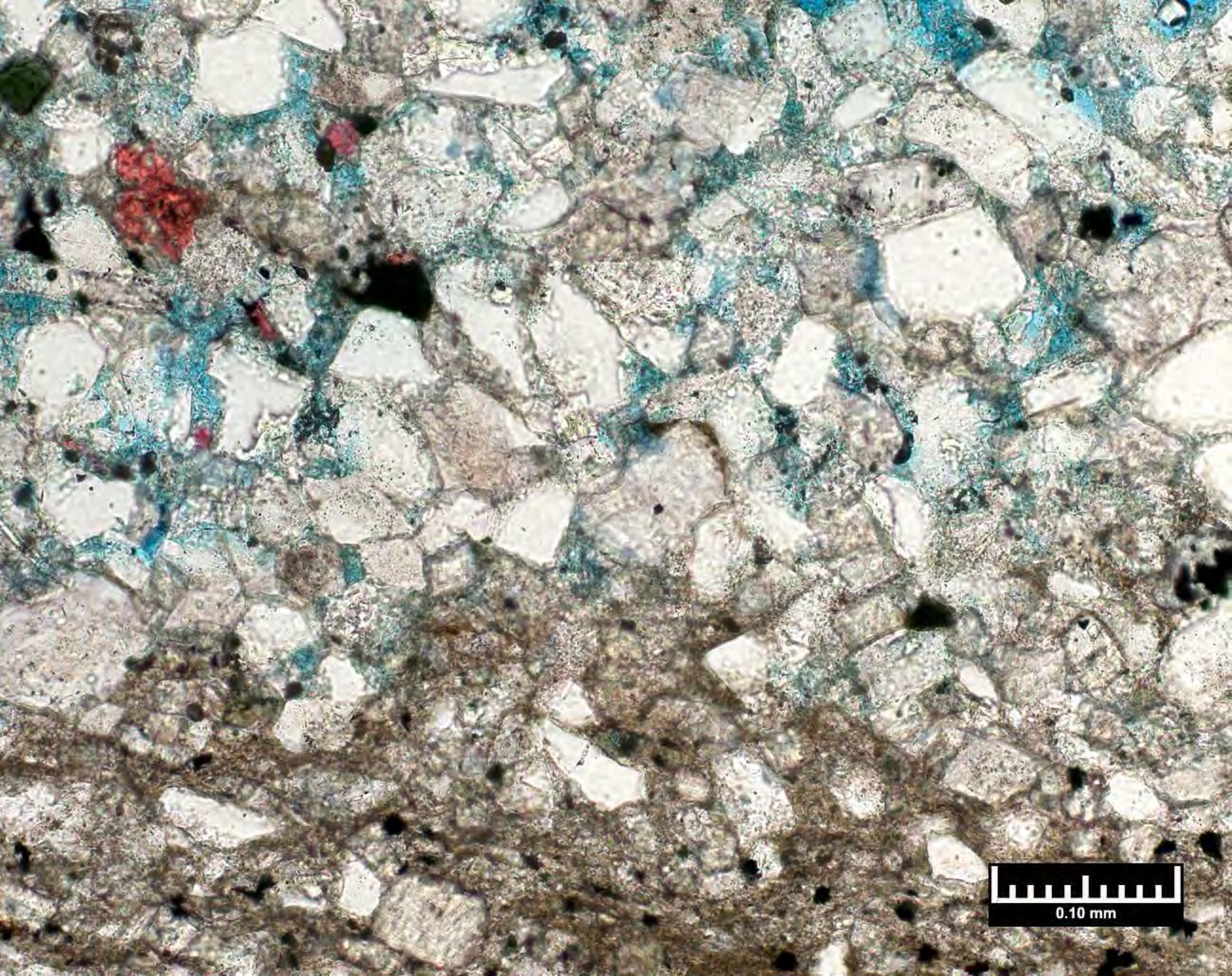
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G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9630.50 Feet
Sample Number: 1-50

Plate 2

Klink. Perm. (2600 psi): <0.0001 md
Porosity (2600 psi): 4.0%
Grain Density: 2.72 gm/cc

Lithology: Calcareous, dolomitic, silty, very fine-grained sandstone (A-B1-15, G1-15, photo A; rows E-K, photo B) and slightly argillaceous, calcareous, dolomitic, sandy siltstone to silty/sandy dolostone (rows C-E,H, photo A)

Texture: Obscured by extensive dolomite replacement; laminated; alternating matrix-poor and matrix-rich laminations; some sandstone laminations are discontinuous; possible localized burrows; a few laminations with relative concentrations of replacement pyrite; calcite content generally decreases upward; common small carbonaceous fragments are partially pyrite replaced (G10,G-H1.5, photo B)

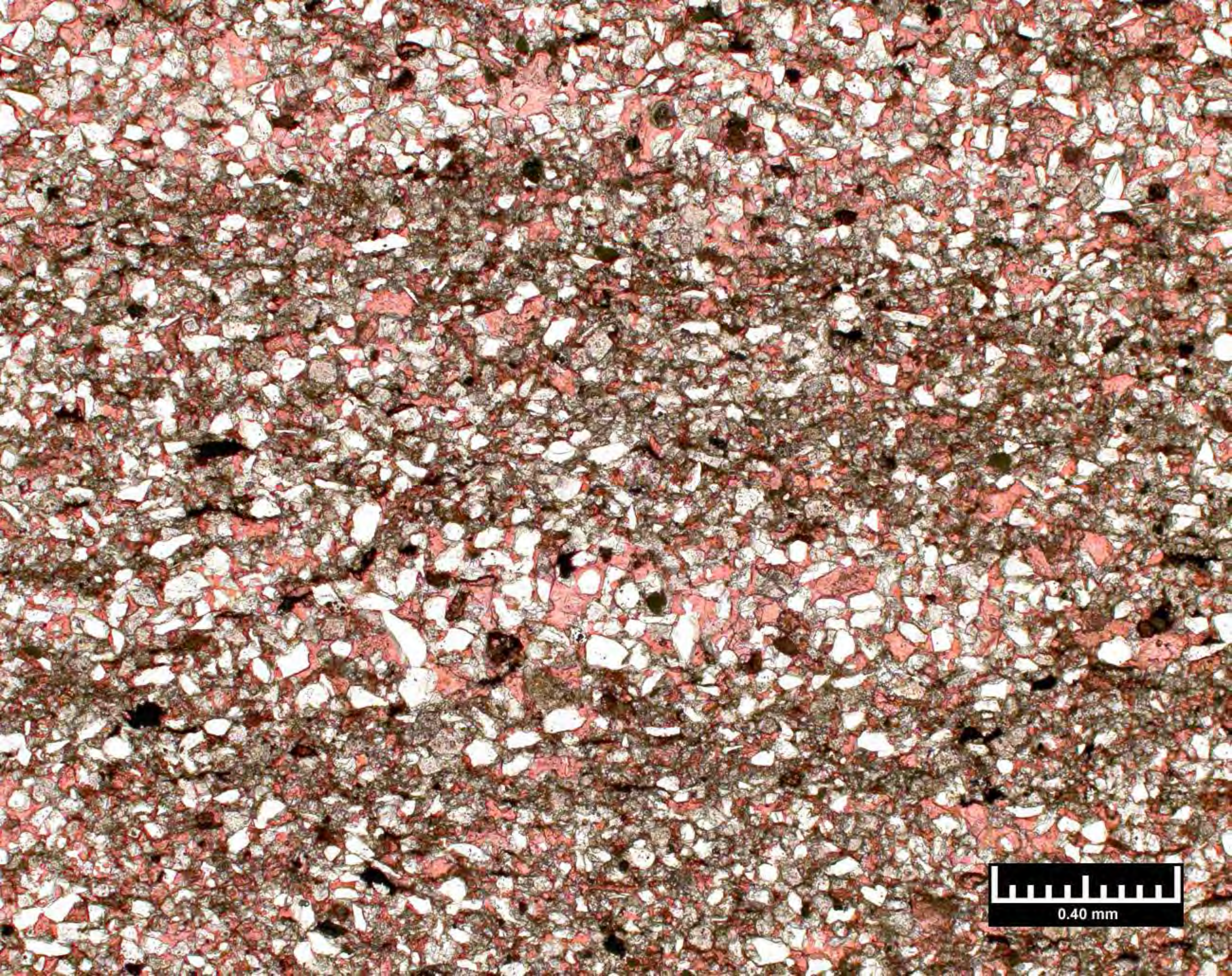
Grains: Abundant angular to subround siliciclastic grains have a slightly irregular distribution and range from silt to fine sand size (up to 0.15 mm); estimated average grain size = 0.07 mm; monocrystalline quartz (J-K9, photo B) > feldspar (potassium feldspar ~ plagioclase; G-H2.5, photo B) > polycrystalline quartz (E-F2.5, photo B) > muscovite > chert > shale/mudstone fragments > biotite/altered biotite, heavy minerals (zircon, titanium oxide, tourmaline), altered volcanic fragments, sericite-altered grains; common small, abraded calcareous bioclast(?) fragments (D6,H9.5,K11, photo B) and very small intraclasts; trace phosphatic fragments

Matrix: Irregularly distributed depositional matrix appears to support grains in some laminations; composed of varying amounts of remnant detrital clay and very fine to medium crystalline replacement dolomite (brownish gray areas; B-C5,E12,H14.5, photo A); XRD analysis has detected 10 wt.% total clay that is dominantly composed of illite (8 wt.%), with minor amounts of mixed-layer illite/smectite (1 wt.%) and chlorite (1 wt.%), and a trace of kaolinite

Cements and Replacement Minerals: Common to abundant calcite has filled intergranular pores in matrix-poor laminations (F1.5,H4, photo B) and has also replaced grains (A-B7,H7, photo B); common very fine to medium crystalline, euhedral to anhedral dolomite occurs as a replacement of argillaceous (and precursor carbonate?) matrix, possibly has replaced precursor carbonate grains, and is present as intergranular cement in grain-rich laminations (light gray; F11.5,J3, photo B); localized quartz overgrowths (D-E5,G-H5.5, photo B) and thin coatings of authigenic clay (E-F9, photo B) have formed in some matrix-poor areas, filling primary pores; trace feldspar overgrowths; common erratically distributed pyrite is concentrated along a few laminations, and occurs as replacement of matrix, carbonate and siliciclastic grains, and carbonaceous fragments (black; D-E10.5,H3,J-K10.5, photo B); trace titanium oxide as an alteration of grains

Pore System: Trace amounts of remnant intergranular pores and secondary grain dissolution pores resulting from dissolution of siliciclastic grains (feldspar); calcite cement has greatly reduced intergranular porosity; traces of micropores are visible within altered/partially leached grains and between crystals of authigenic clays

Magnification: A: 50X B: 200X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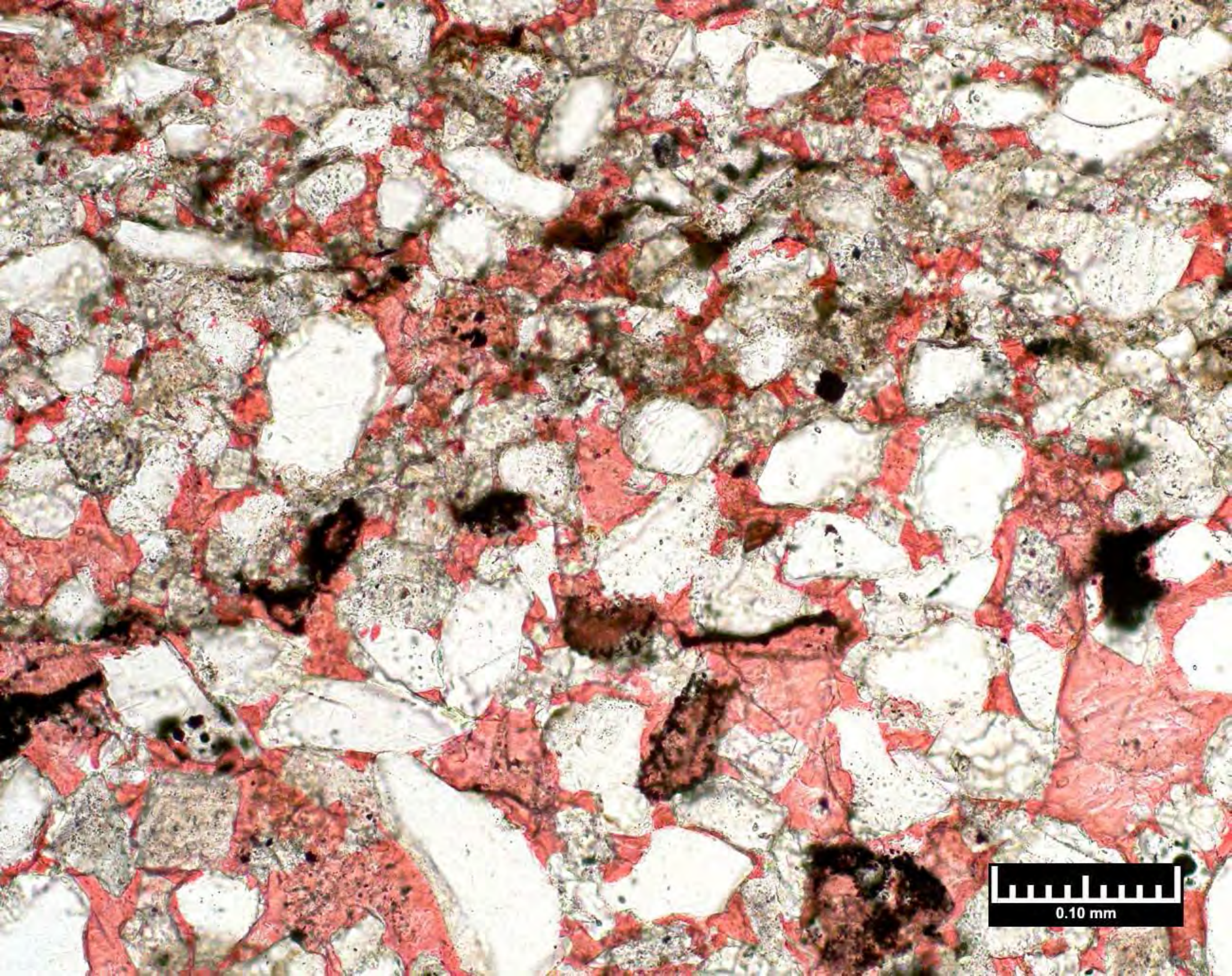
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G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9633.50 Feet
Sample Number: 1-53

Plate 3

Klink. Perm. (2600 psi): 0.017 md
Porosity (2600 psi): 7.1%
Grain Density: 2.72 gm/cc

Lithology: Slightly calcareous, argillaceous, silty/sandy dolostone to dolomitic, silty, very fine-grained sandstone

Texture: Obscured by extensive dolomite replacement; burrowed with faint remnant bedding, including an apparent detrital clay-rich lamination; a relatively large compacted mudstone fragment is highlighted in photomicrographs (F7.5, photo A; C1 to K6, photo B); localized concentrations of replacement pyrite (burrows?)

Grains: Abundant silt to sand-size (up to 0.18 mm) siliciclastic grains dominantly have subangular to angular shapes; estimated average grain size = 0.07 mm; monocrystalline quartz (G-H10, photo B) > feldspar (potassium feldspar ~ plagioclase; D-E4.5, photo B) > polycrystalline quartz > muscovite (F-G12, photo B) > altered argillaceous grains, chert, biotite/altered biotite, heavy minerals (G-H9, photo B; zircon, titanium oxide, tourmaline) > sericite-altered grains, glauconite, schist fragments(?); sparsely scattered small, abraded calcareous bioclast(?) fragments (E3.5, photo A; A2.5, photo B)

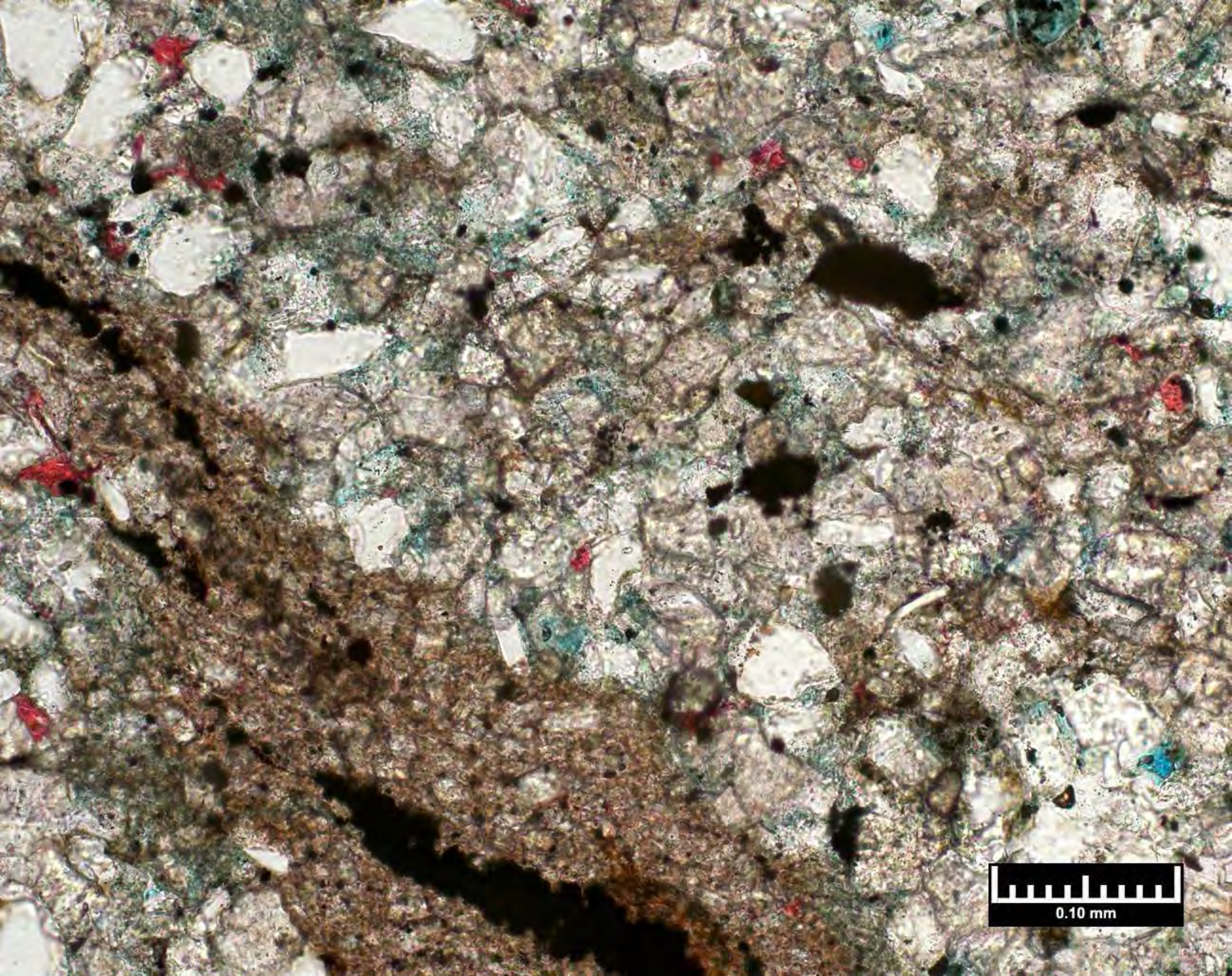
Matrix: Identification of matrix has been impeded by dolomite replacement; irregularly distributed detrital clay; depositional matrix appears to support grains in some areas; composed of varying amounts of remnant detrital clay and very fine to medium crystalline replacement dolomite

Cements and Replacement Minerals: Abundant very fine to medium crystalline, euhedral to anhedral dolomite occurs as a replacement of argillaceous (and precursor carbonate?) matrix, possibly has replaced precursor carbonate grains, and may occur as intergranular cement in grain-rich areas (light gray; B4,G9, photo B); minor erratically distributed quartz cement occur as thin, discontinuous overgrowths, often along grain contacts (F8,H10, photo B); authigenic clay has formed thin coatings on grains or fills intergranular areas in matrix-poor portions of the sample (C-D6.5,F8.5, photo B); common disseminated small crystals, framboids, and crystal aggregates of pyrite as a replacement of matrix, carbonate and siliciclastic grains, and carbonaceous fragments (black; E-F10,K7, photo B); trace authigenic titanium oxide

Pore System: Dominantly micropores that occur between crystals of authigenic clays and within altered/partially leached grains (bluish hue; A-B10.5,C-D6,H-J10, photo B); very minor amount of isolated intergranular pores are locally preserved in matrix-poor areas; very minor secondary grain dissolution pores resulting from dissolution of siliciclastic grains (including feldspar)

Magnification: A: 50X B: 200X

0.40 mm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G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9635.95 Feet
Sample Number: 1-55

Plate 4

Klink. Perm. (2600 psi): 0.072 md (fractured)
Porosity (2600 psi): 5.8%
Grain Density: 2.73 gm/cc

Lithology: Calcareous, dolomitic, silty, very fine-grained sandstone to slightly calcareous, slightly argillaceous, silty/sandy dolostone

Texture: Obscured by extensive dolomite replacement; alternating sandstone and dolostone beds disturbed by burrowing; pyrite concentrated along a few laminations

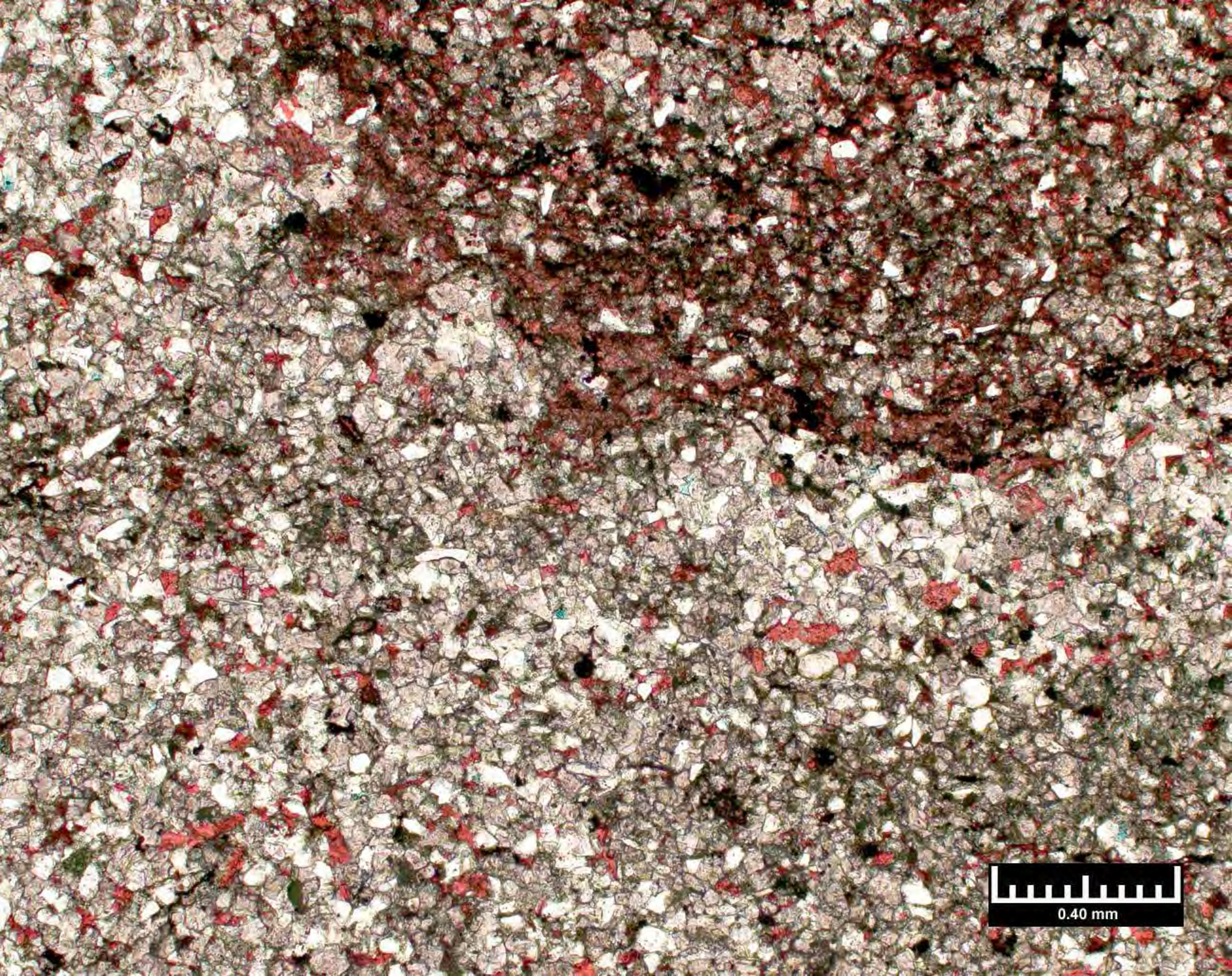
Grains: Abundant silt to very fine sand-size (up to 0.12 mm) siliciclastic grains dominantly have subangular to angular shapes; estimated average grain size = 0.06 mm; monocrystalline quartz (F14, photo B) > feldspar (potassium feldspar ~ plagioclase; F-G8, photo B) > polycrystalline quartz > muscovite > shale/mudstone fragments, altered argillaceous grains > chert > biotite/altered biotite, heavy minerals (titanium oxide, tourmaline), altered volcanic fragments(?); common scattered small, abraded calcareous bioclast(?) fragments (E9.5,H-J13, photo B), and one larger, recrystallized bioclast fragment (~0.80 mm in length)

Matrix: Identification of matrix has been impeded by dolomite replacement; irregularly distributed detrital clay; depositional matrix appears to support grains in dolostone laminations; composed of varying amounts of remnant detrital clay and very fine to medium crystalline replacement dolomite

Cements and Replacement Minerals: Abundant very fine to medium crystalline, euhedral to anhedral dolomite occurs as a replacement of argillaceous (and precursor carbonate?) matrix, has possibly replaced precursor carbonate grains and siliciclastic grains, and is an intergranular cement in grain-rich areas (light gray; C9,D-E5,G-H7, photo B); abundant small crystals, framboids, and crystal aggregates of pyrite replace matrix, carbonaceous fragments, and grains (black; B11,D12.5, photo B); common calcite occurs as intergranular cement and replacement of siliciclastic grains (including feldspar); erratically distributed quartz cement occur as partial overgrowths on some quartz grains and also have formed along grain contacts (C-D9.5,F-G4.5, photo B); authigenic clay has formed thin coatings on grains or fills intergranular areas in matrix-poor portions of the sample (G6.5,H-J11.5, photo B); trace authigenic titanium oxide

Pore System: Erratically distributed pores are most common in portions of sandstone laminations lacking matrix; dominantly micropores that occur between crystals of authigenic clays and detrital grains, as well as within altered/partially leached grains (bluish hue; D-E2.5,H-J10.5,J7.5, photo B); small intergranular/intercrystalline pores are locally preserved in matrix-poor areas (E-F5,F-G14,G12, photo B); very minor secondary grain dissolution pores resulting from dissolution of siliciclastic grains (including feldspar; D-E14.5,F-G6.5, photo B)

Magnification: A: 50X B: 200X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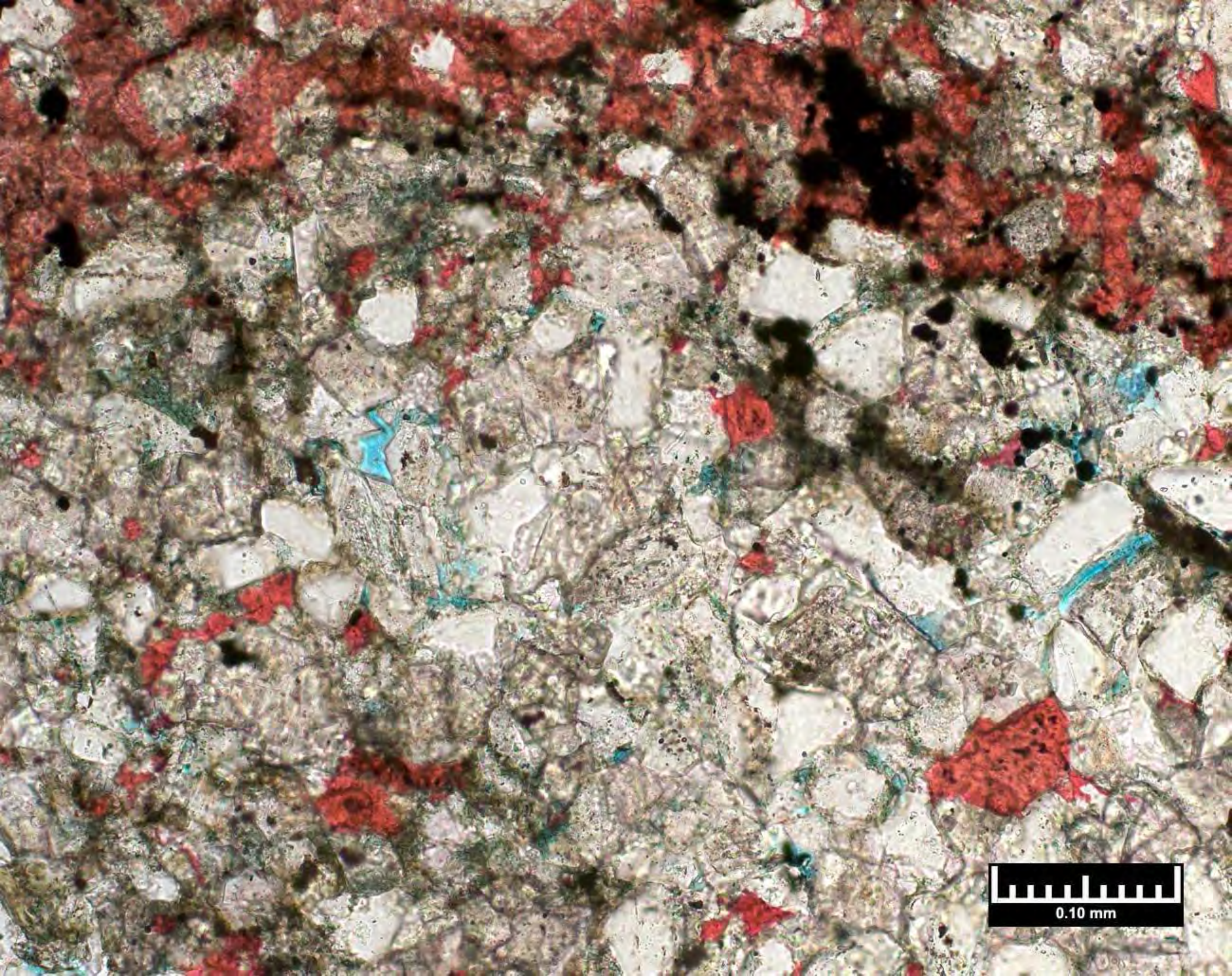
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G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9639.50 Feet
Sample Number: 1-59

Plate 5

Klink. Perm. (2600 psi): 0.0019 md
Porosity (2600 psi): 6.6%
Grain Density: 2.72 gm/cc

Lithology: Slightly calcareous, slightly argillaceous, silty/sandy dolostone to dolomitic, sandy siltstone

Texture: Obscured by extensive dolomite replacement; burrowed, with localized traces of remnant bedding, including argillaceous laminations and sand-rich laminations; a large brachiopod fragment has been partially dissolved by pressure dissolution and partially pyrite-replaced (B2, photo A; A10 to F2, photo B)

Grains: Abundant subangular to angular silt to very fine sand-size (up to 0.12 mm) siliciclastic grains; estimated average grain size = 0.05 mm; monocrystalline quartz (D-E2.5, photo B) > feldspar (potassium feldspar ~ plagioclase; B-C14.5, photo B) > polycrystalline quartz > muscovite > shale/mudstone fragments, altered argillaceous grains > chert > biotite/altered biotite, heavy minerals (titanium oxide, zircon; J-K9.5, photo B), schist fragments(?); common scattered small, abraded calcareous bioclast fragments (C-D5,H-J7.5, photo A; G11, photo B); a large brachiopod valve is >17 mm in length

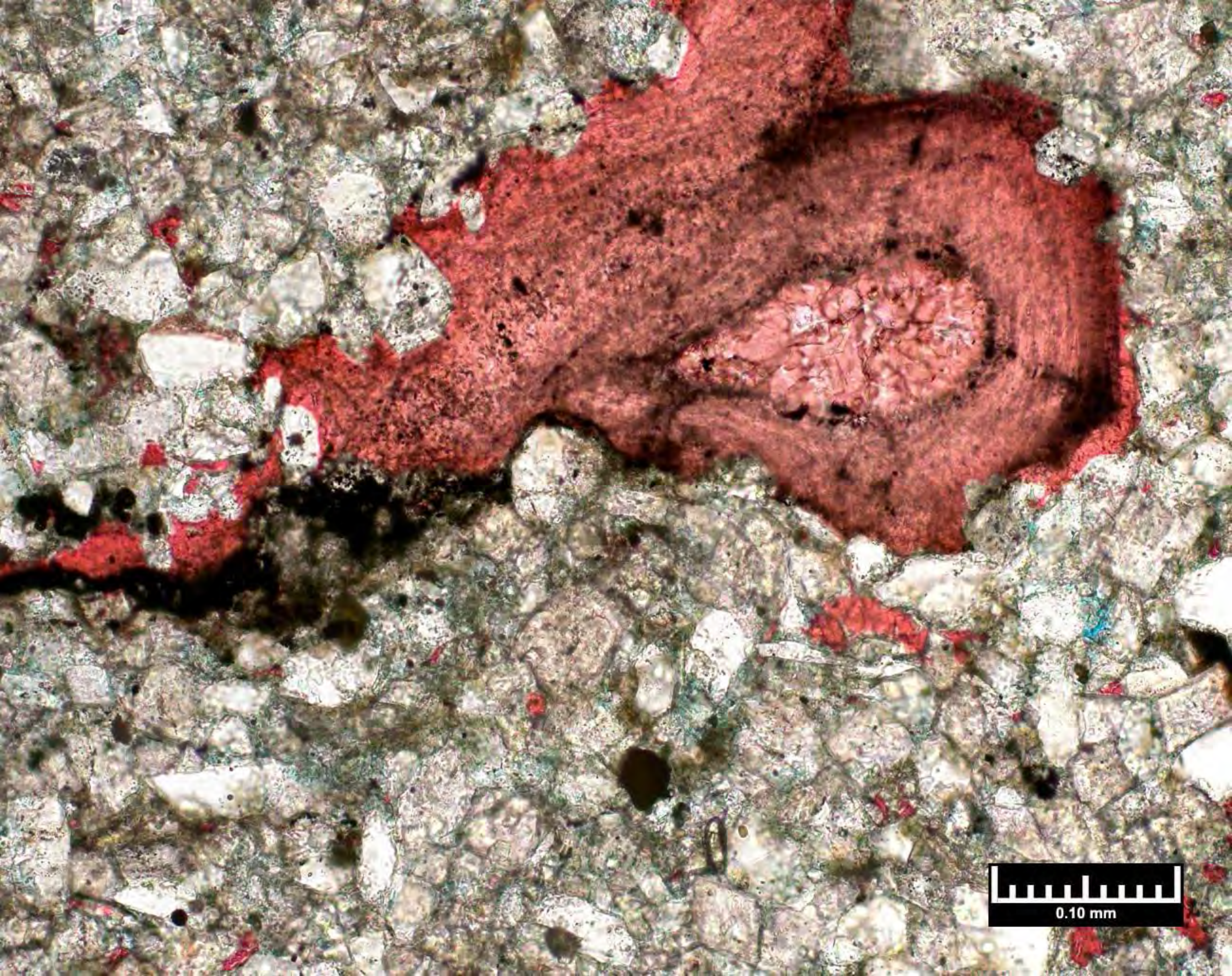
Matrix: Common irregularly distributed detrital clay matrix (brown; A-B6.5,H5.5, photo B) is most common within the remnants of matrix-rich laminations; extensively replaced by very fine to medium crystalline replacement dolomite (H5.5,G-H6.5, photo B)

Cements and Replacement Minerals: Abundant very fine to medium crystalline, subhedral to anhedral dolomite occurs as a replacement of argillaceous (and precursor carbonate?) matrix and as replacement of precursor carbonate grains and siliciclastic grains (light gray; B-C2.5,G7.5,K9.5, photo B); common small crystals, framboids, and crystal aggregates of pyrite replace matrix, carbonaceous fragments, and grains (black; E-F4.5,H-J8.5, photo B); calcite is erratically distributed as a replacement of grains and an intergranular/intercrystalline and intraparticle cement (stained red; D11, photo B); minor amount of authigenic clay has formed in intergranular areas lacking detrital matrix (H9,H12, photo B); very minor quartz overgrowth cement and rare feldspar overgrowths in matrix-poor areas (F-G13, photo B); trace authigenic titanium oxide

Pore System: Dominantly micropores that are present within intergranular detrital and authigenic clays (bluish hue; B3.5,G-H9,H-J5, photo B); widely scattered, very small intergranular pores occur in matrix poor portions of the sample (G14, photo B); very minor secondary grain dissolution pores resulting from dissolution of siliciclastic grains (including feldspar; A2, photo B)

Magnification: A: 50X B: 200X

0.40 mm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G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9660.50 Feet
Sample Number: 1-80

Plate 6

Klink. Perm. (2600 psi): N/A
Porosity (amb.): 8.9%
Grain Density: 2.31 gm/cc

Lithology: Organic-rich, silty shale

Texture: Laminated with rare possible small subhorizontal burrows; common compacted spores (*Tasminites*) aligned along bedding (orange; B-C12,F2, photo B); locally extensive pyrite replacement along laminations

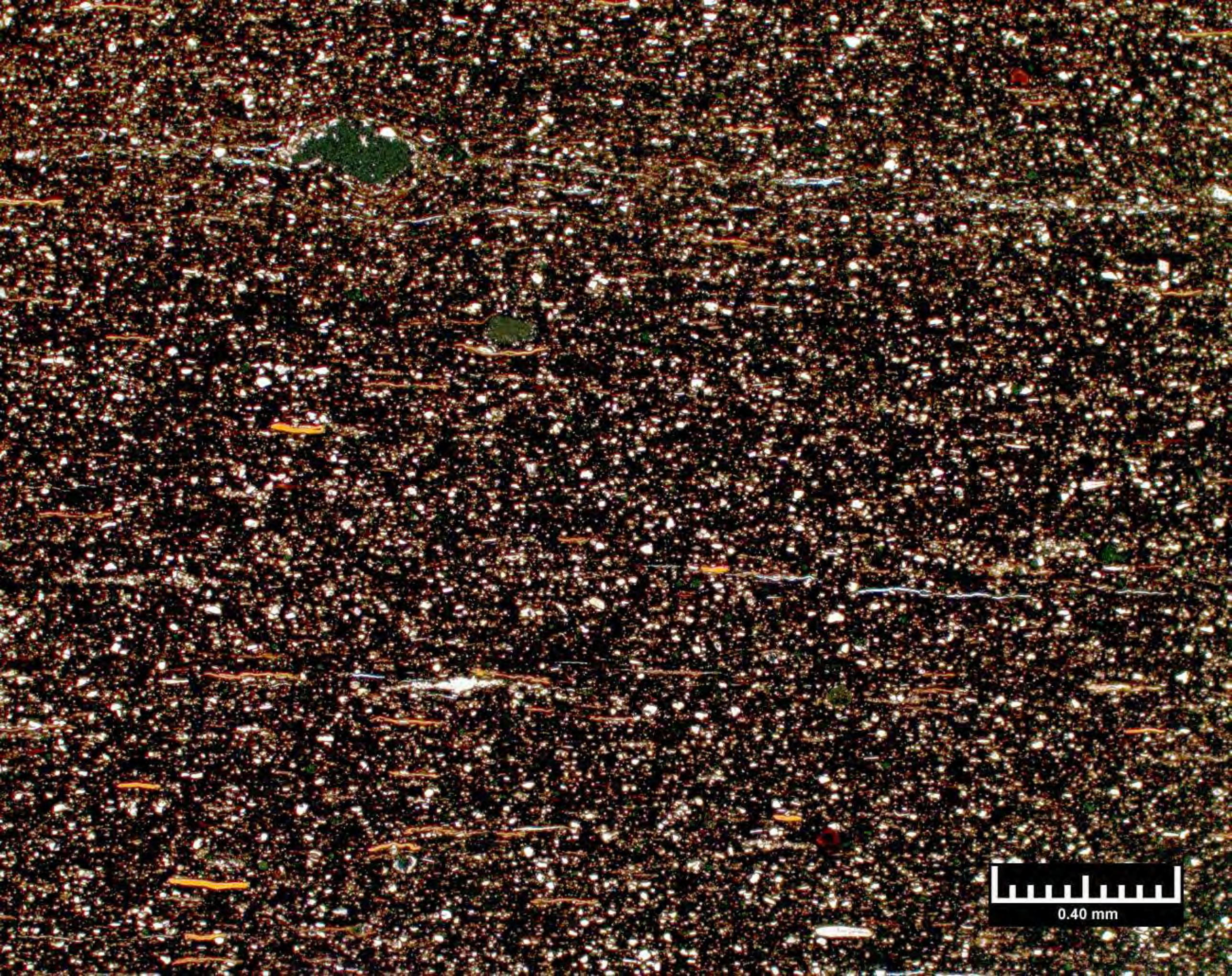
Grains: Abundant subangular to angular silt-size (up to 0.05 mm) siliciclastic grains; estimated average grain size = 0.02 mm; monocrystalline quartz (C-D3.5, photo B) > feldspar (potassium feldspar ~ plagioclase) > muscovite > polycrystalline quartz > chert > biotite/altered biotite, heavy minerals (titanium oxide); common, fairly evenly distributed, compacted spores (*Tasminites*; orange; E4,J-K3, photo A; A10,F2, photo B); sparsely scattered compacted agglutinated foraminifera (H6, photo A); trace phosphatic fragments

Matrix: Abundant detrital clay-rich matrix supports grains; appears dominantly composed of detrital clay with interspersed organic matter; clays appear well aligned, with most crystals displaying "unit extinction" under crossed nicols; abundant intermixed small crystals of replacement pyrite and sparsely scattered crystals of replacement dolomite (G2, photo B)

Cements and Replacement Minerals: Abundant pyrite (black; F-G11.5,H6.5, photo B) is fairly evenly distributed as a replacement of matrix, organic matter, and agglutinated foraminifera, and is concentrated along a few laminations; minor authigenic quartz occurs as cement within some less compacted spores; sparsely scattered fine crystalline dolomite occurs is a replacement of matrix; a few relatively large crystals of authigenic apatite occurs as cement in spores (B-C12.5, photo B) or as non-selective replacement (A-B12, photo B)

Pore System: No visible pores using standard petrographic techniques

Magnification: A: 50X B: 200X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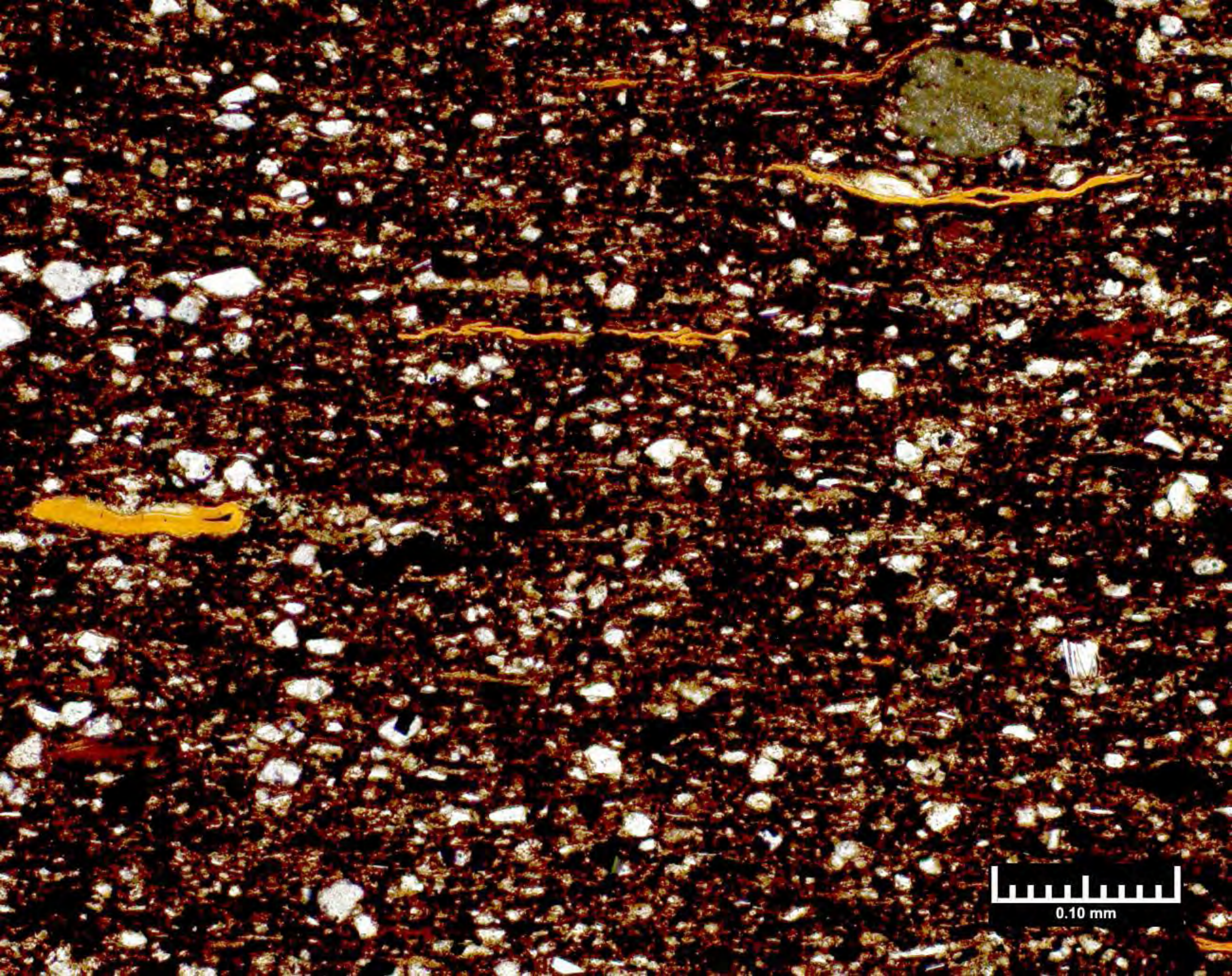

0.10 mm

G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9663.50 Feet
Sample Number: 1-83

Plate 7

Klink. Perm. (2600 psi): N/A (fractured)
Porosity (amb.): 5.5%
Grain Density: 2.75 gm/cc

Lithology: Organic-rich, phosphatic, dolomitic, pyritic, argillaceous, very fine-grained sandstone to sandy dolostone, with thin silty/sandy shale laminations

Texture: Poorly defined bedding that is disturbed by varying amounts of burrowing; generally coarsens upward (decreasing matrix, increasing siliciclastic sand content), with thin argillaceous laminations in the lower portion of the sample and more matrix-poor sandstone bed comprising the upper portion of the sample; abundant phosphatic bioclast fragments (mostly vertebrate debris), with common apparent ooids that are composed of calcium phosphate or most of which have been replaced by pyrite; abundant pyrite-replaced grains in sandstone; common large organic fragments, many of which have been partially replaced by pyrite

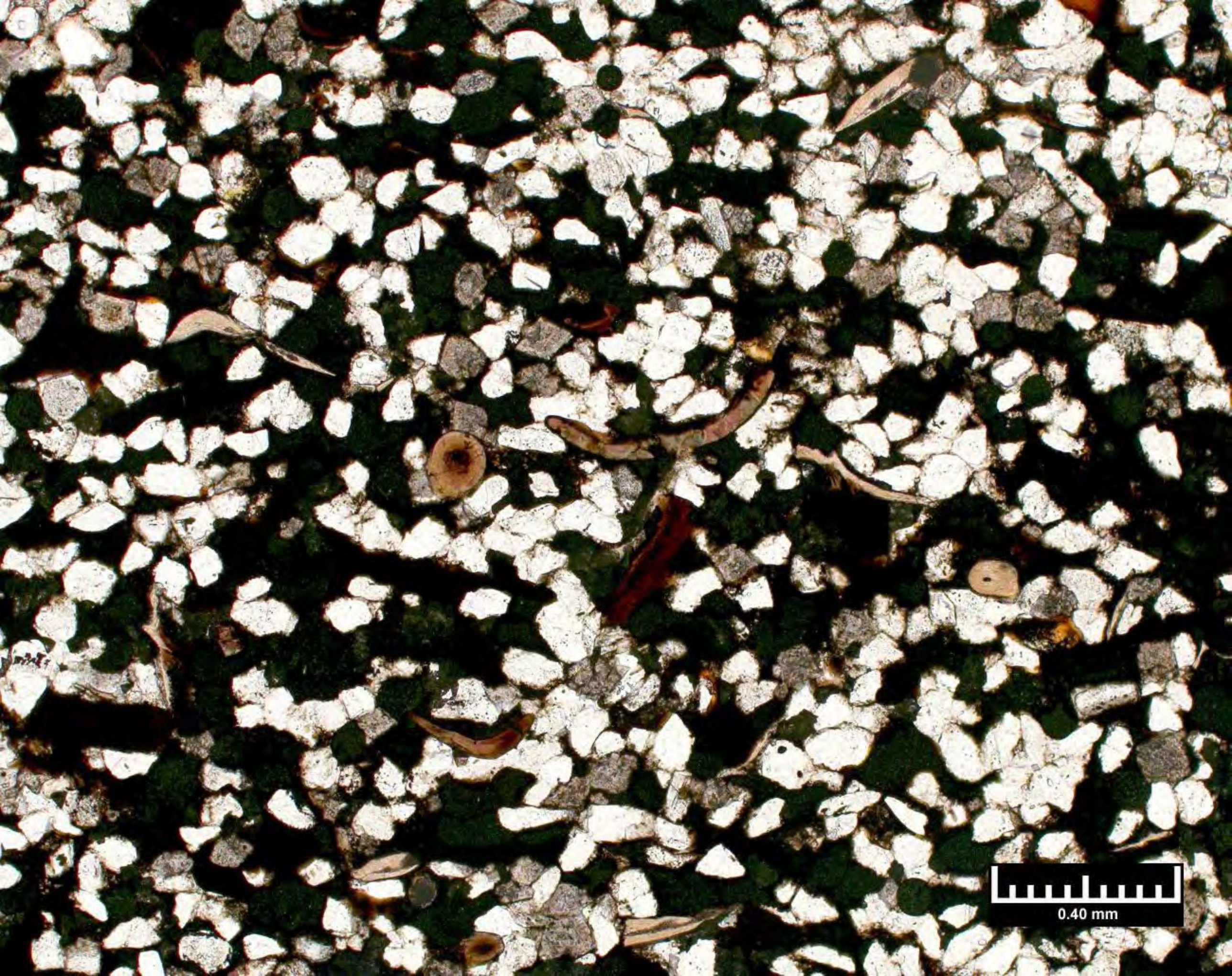
Grains: Abundant subround to angular siliciclastic grains have an estimated average grain size = 0.10 mm (upper very fine sand); monocrystalline quartz (B-C6.5, photo B) >> feldspar (potassium feldspar > plagioclase) > polycrystalline quartz > heavy minerals (titanium oxide, zircon, tourmaline) > muscovite > chert, biotite; abundant calcium phosphatic fragments, including vertebrate debris and small ooids (D3, photo B); also common pyrite-replaced small ooids (A-B8, photo A); common, often slightly compacted and cemented spores (*Tasminites*?)

Matrix: Variable amount of matrix appears most abundant in the lower portion of the sample, which contains thin shale laminations with matrix-supported silt/sand grains; irregularly distributed within intergranular areas in the upper sand bed; appears dominantly composed of detrital clay with interspersed organic matter; appears locally replaced by authigenic quartz/chert, and is partially replaced by dolomite (A-B12, photo B)

Cements and Replacement Minerals: Abundant pyrite (black; F-G11.5,H6.5, photo B) is an extensive replacement of grains, matrix, and organic matter, and has also filled spores and/or replaced precursor sediment within spores; common medium crystalline dolomite has partially replaced matrix and grains (grey; A3.5,F9.5, photo A; A-B3.5,D1, photo B); variable amounts (rare to common) of quartz overgrowth cement is most common in the upper, more matrix-poor sandstone bed, filling intergranular pores lacking matrix (B7,C-D14,F-G6.5, photo B); erratically distributed authigenic apatite has replaced matrix and grains, and has formed in remnant intergranular and intraparticle pores; matrix appears locally replaced by authigenic chert(?); trace amounts of feldspar overgrowths and calcite cement

Pore System: Trace intraparticle pores within phosphatic fragments

Magnification: A: 50X B: 200X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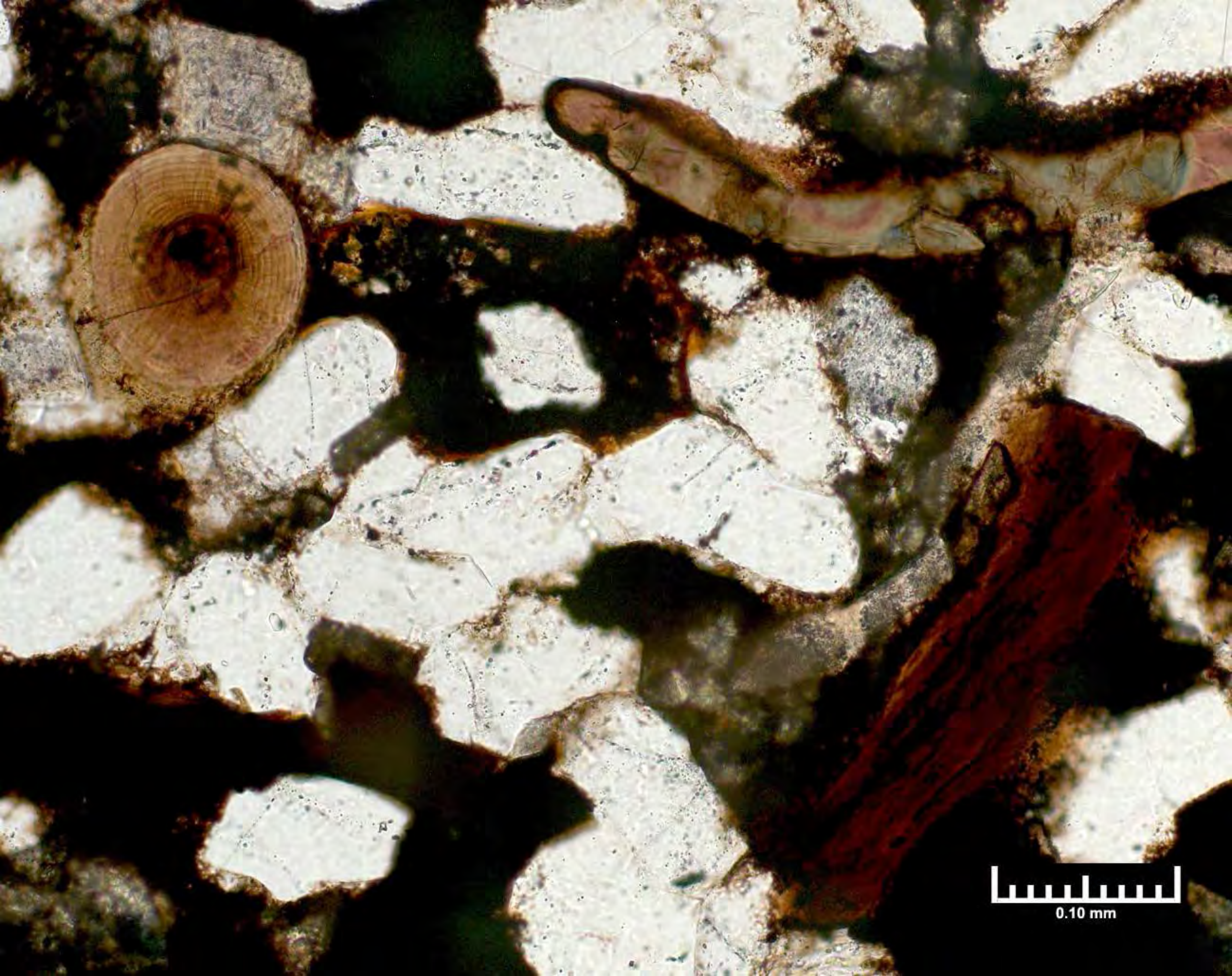
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G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9669.30 Feet
Sample Number: 1-83

Plate 8

Klink. Perm. (2600 psi): 0.458 md (fractured)
Porosity (2600 psi): 8.0%
Grain Density: 2.81 gm/cc

Lithology: Slightly silty, argillaceous dolostone to silty/sandy dolostone

Texture: Deformed fabric, with remnants of more matrix-rich (slightly silty, argillaceous dolostone) and more grain-rich laminations (silty/sandy dolostone); locally brecciated with sediment infill (photo A); matrix-rich laminations locally appear partially eroded or ripped-up; bedding appears truncated by burrowing and soft-sediment deformation; remnant grain-rich laminations are cross-bedded, with bidirectional bedding locally apparent; common intraclasts in apparent grain-rich laminations/areas; locally common discontinuous anhydrite-filled fractures

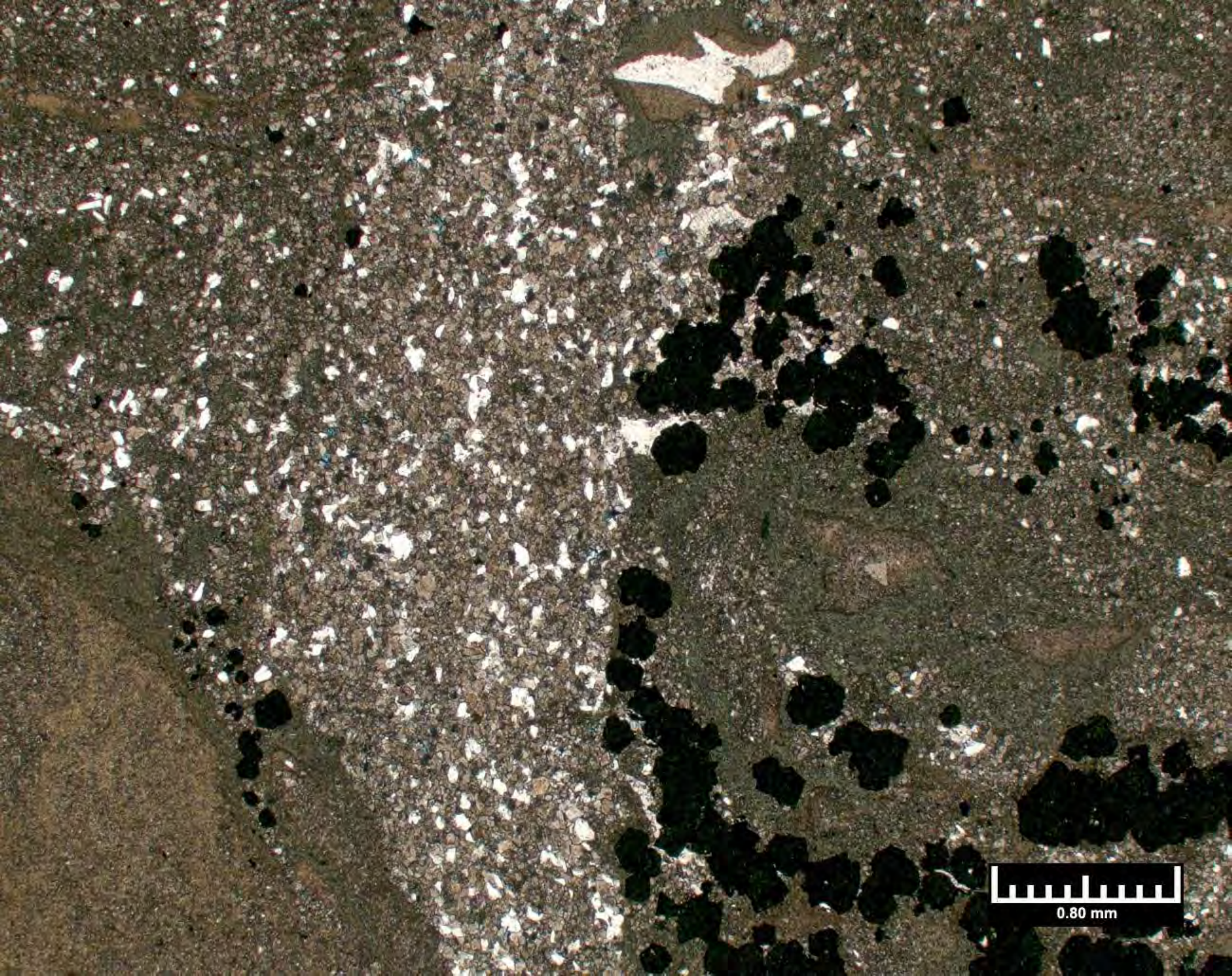
Grains: Common erratically distributed, dominantly subangular to angular siliciclastic grains range from silt to fine sand size (up to 0.16 mm); estimated average grain size = 0.07 mm (lower very fine sand); monocrystalline quartz (H-J13, photo B), altered argillaceous clasts (A-B8.5, photo A) > feldspar (potassium feldspar > plagioclase; G-H12.5, photo B) > polycrystalline quartz > muscovite > chert > heavy minerals (titanium oxide, tourmaline); apparent grain-rich laminations/areas contain varying quantities of small dolomicritic clasts/peloids

Matrix: Difficult to discern due to extensive dolomitization; appears irregularly distributed, with matrix-rich and matrix-poor laminations/areas present; appears composed of varying proportions of remnant detrital clay, replacement very fine to fine crystalline dolomite, and replacement cryptocrystalline quartz(?); areas with apparent cryptocrystalline quartz replacement have subdued birefringence

Cements and Replacement Minerals: Abundant, dominantly anhedral to subhedral, very fine to fine crystalline dolomite occurs as a replacement of the detrital matrix and grains (mostly intraclasts); minor blocky to bladed anhydrite occurs as replacement of intraclasts (white; A-B9, photo A; A3-14, photo B), localized non-selective replacement, and mold-filling cement; erratically distributed pyrite occurs in small crystal aggregates as a non-selective replacement (black; D-E9,J15, photo B); minor quartz cement has formed partial overgrowths that have filled intergranular areas between quartz grains and intercrystalline voids adjacent to quartz grains (E-F12.5,H-J14, photo B); trace feldspar overgrowths

Pore System: Irregularly distributed pores; dominantly small intercrystalline pores that occur between replacement dolomite crystals in clay-poor areas, and micropores that are present in altered argillaceous clasts (bluish hue; F6.H8.5, photo B) and remnant detrital clay matrix; rare small grain moldic pores; trace secondary dissolution pores in partially leached feldspar grains

Magnification: A: 25X B: 200X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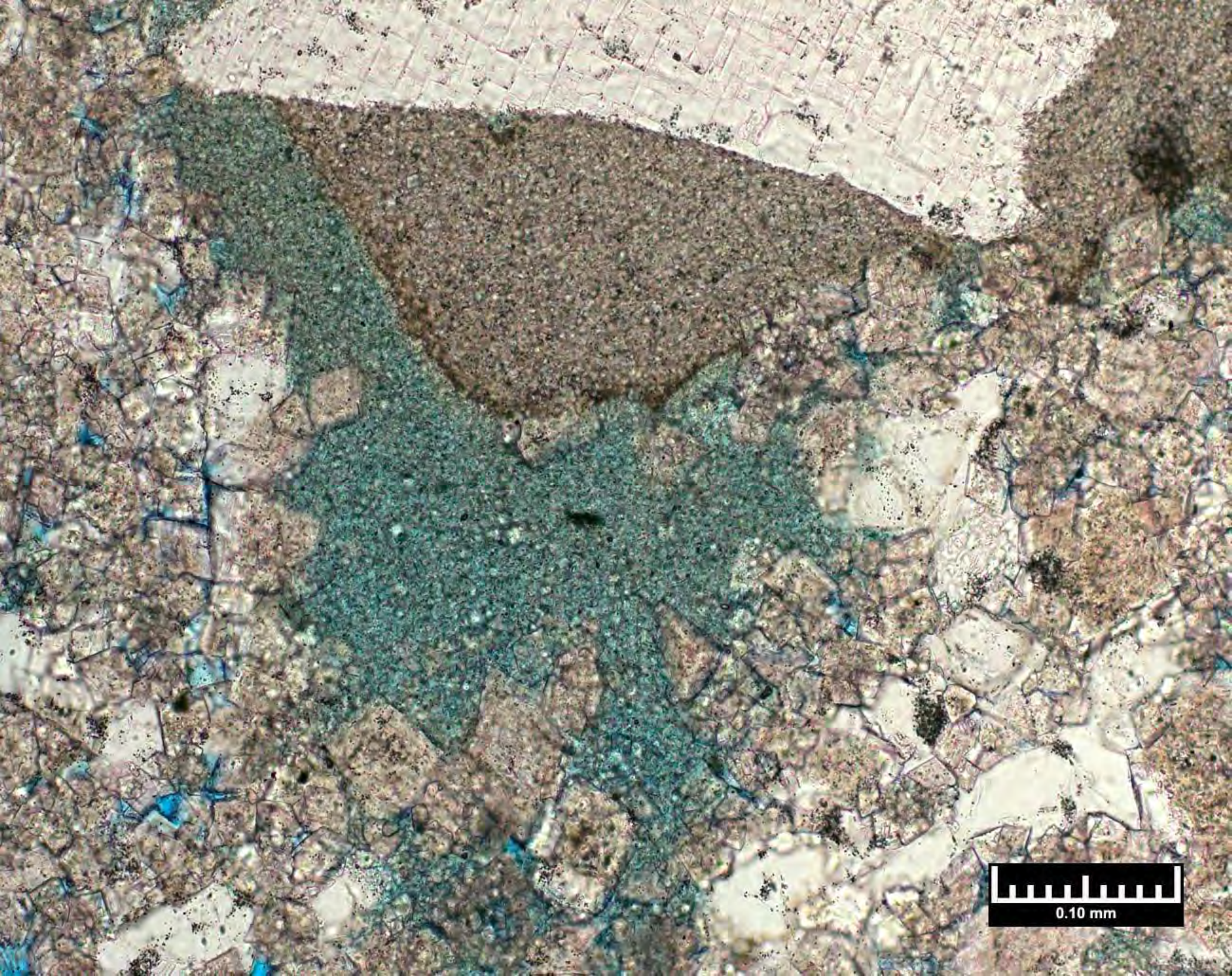
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G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9670.55 Feet
Sample Number: 1-90

Plate 9

Klink. Perm. (2600 psi): N/A (fractured)
Porosity (amb.): 8.5%
Grain Density: 2.80 gm/cc

Lithology: Slightly silty dolostone and slightly silty, argillaceous dolostone to dolomitic shale

Texture: Obscured by extensive dolomitization; complex fabric; dominantly inferred grain-rich laminations (packstone to grainstone) that contain slightly wavy laminations to ripple cross-laminations, with thin argillaceous laminations and discontinuous wispy laminations, some of which have been partially eroded; bedding locally disturbed by burrows(?) and soft-sediment deformation (fluidization, loading, microflame); several apparent fining-upwards laminations, some including matrix-rich drapes; a few truncation surfaces; localized concentrations of elongate/tabular rip-up clasts (G12.5,H9, photo A) and laminations with concentrations of small mudstone clasts; a thin, discontinuous fracture is filled with pyrite and anhydrite (A7.5 to E7, photo A); also a thin, discontinuous, sediment-filled fracture (dewatering?)

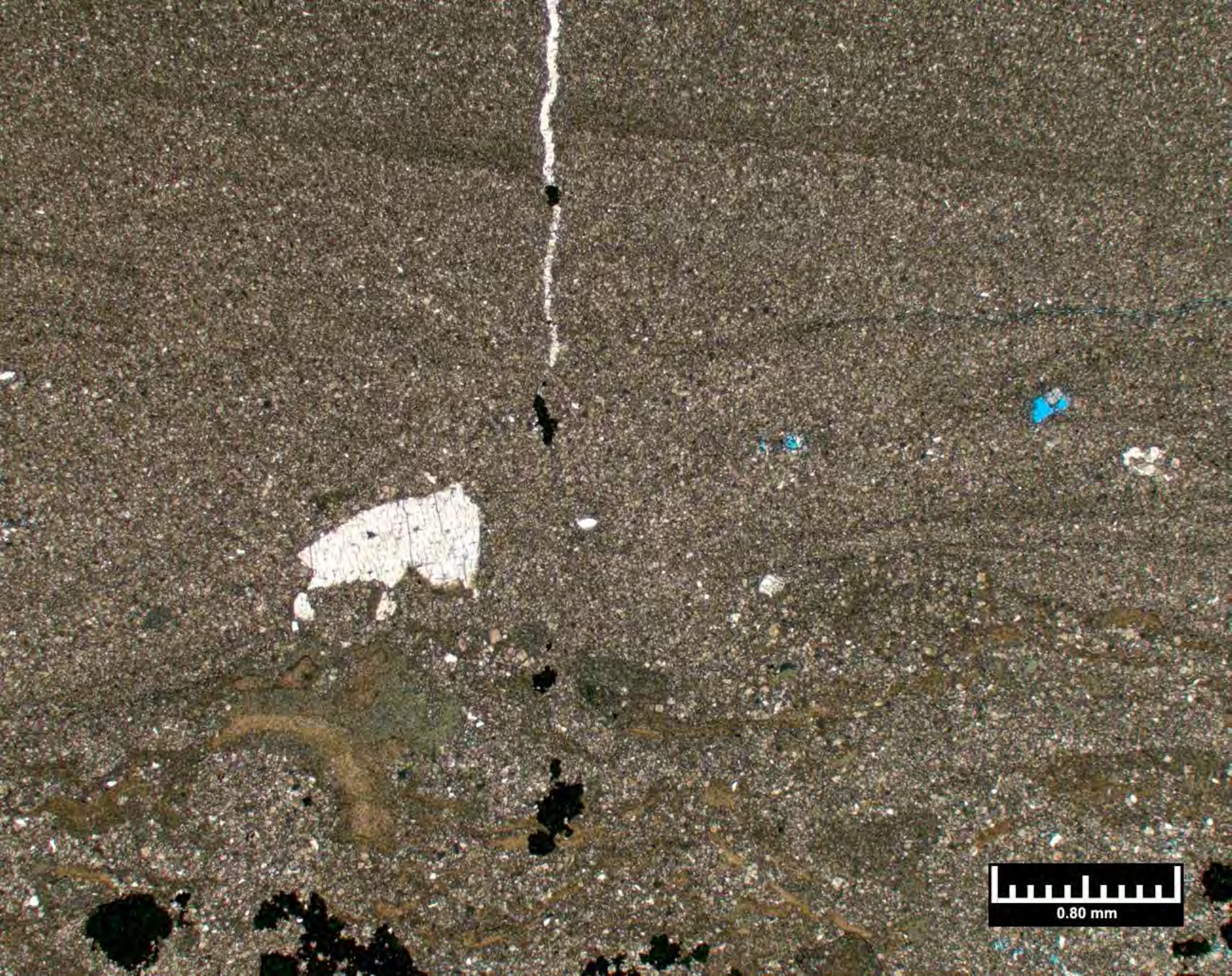
Grains: Common to abundant, variably sized, elongate/tabular to equant mudstone rip-up clasts are concentrated along some laminations (H4,J11.5, photo A); grain-rich laminations contain small dolomicritic clasts/peloids and locally discernible relict grains visible due to subround patterns of replacement dolomite crystals; very sparsely scattered grain molds and anhydrite-cemented molds may represent dissolved bioclasts (E-F14.5,F5.5, photo A); common subangular to angular siliciclastic grains are dominantly silt-size, with rare sand-size grains (up to 0.07 mm; lower very fine sand); estimated average grain size = 0.02 mm; monocrystalline quartz (G9.5, photo B) > feldspar (potassium feldspar > plagioclase) > muscovite > polycrystalline quartz > heavy minerals (titanium oxide)

Matrix: Difficult to discern due to extensive dolomitization; appears irregularly distributed, with matrix-rich and matrix-poor laminations/areas present; composed of varying proportions of remnant detrital clay and replacement very fine to fine crystalline replacement dolomite

Cements and Replacement Minerals: Extensive replacement of matrix, precursor carbonate grains, and rip-up clasts by very fine to fine, dominantly anhedral to subhedral dolomite (brownish gray; B-C14.5,J10, photo B); trace dolomite cement partially fill grain molds; erratically distributed replacement pyrite occurs as sparsely scattered small crystals, with localized concentrations of larger pyrite crystals (black; J7.5,K2, photo A; A6.5,E10, photo B); pyrite also has partially filled the discontinuous fracture (B-C7.5, photo A); minor blocky to bladed anhydrite occurs as replacement of intraclasts (white; A8,C3.5, photo B) and has filled grain molds (F-G5.5, photo A) and a discontinuous fracture (B7.5, photo A); trace quartz overgrowths

Pore System: Dominantly irregularly distributed pores micropores that occur within altered/partially leached argillaceous rip-up clasts (bluish hue; B2,B11,J4, photo B) and within clays present in dolomite intercrystalline areas; a subequal quantity of very small intercrystalline pores that occur within grain-rich laminations (bluish hue; A-B6,H8, photo B); rare grain moldic pores (D-E13.5,E10.5, photo A)

Magnification: A: 50X B: 200X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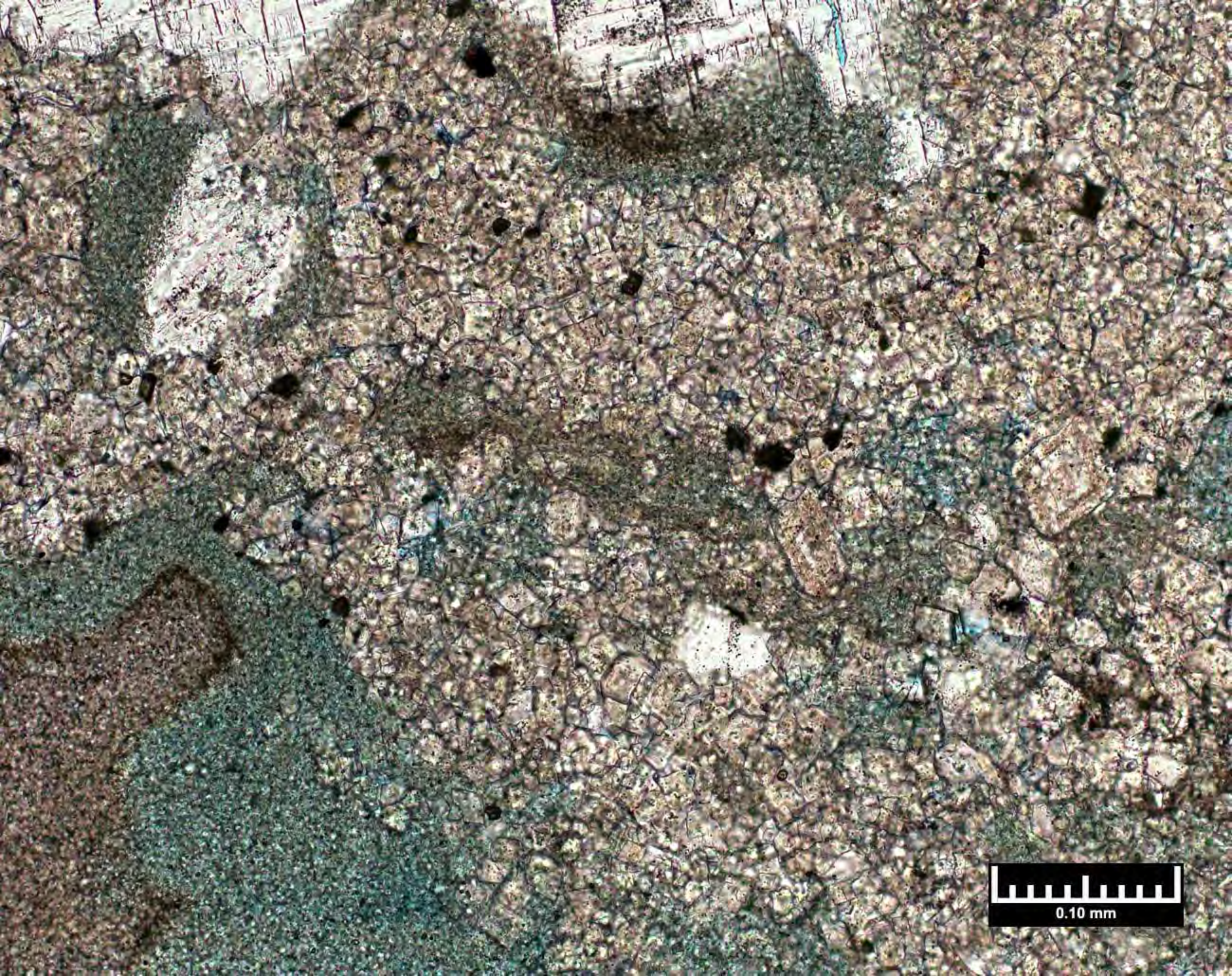

0.10 mm

G3 Operating LLC **WFT Labs File: CO-51887**
Muller No. 1-21-16H
Williams County, North Dakota
Conventional Core

Thin Section Description – General

Sample Depth: 9676.50 Feet
Sample Number: 1-96

Plate 10

Klink. Perm. (2600 psi): 0.0017 md
Porosity (2600 psi): 3.9%
Grain Density: 2.79 gm/cc

Lithology: Slightly argillaceous, silty/sandy dolostone

Texture: Obscured by extensive dolomitization; inferred texture is packstone to grainstone; appears ripple cross-laminated with bedding disturbed by localized burrowing or soft-sediment deformation; a few discontinuous, wispy, argillaceous laminations, some of which appear partially eroded; common elongate/tabular to equant argillaceous rip-up clasts (C3, photo A; C10, J1 photo B) appear to be derived from ripped-up mudstone laminations

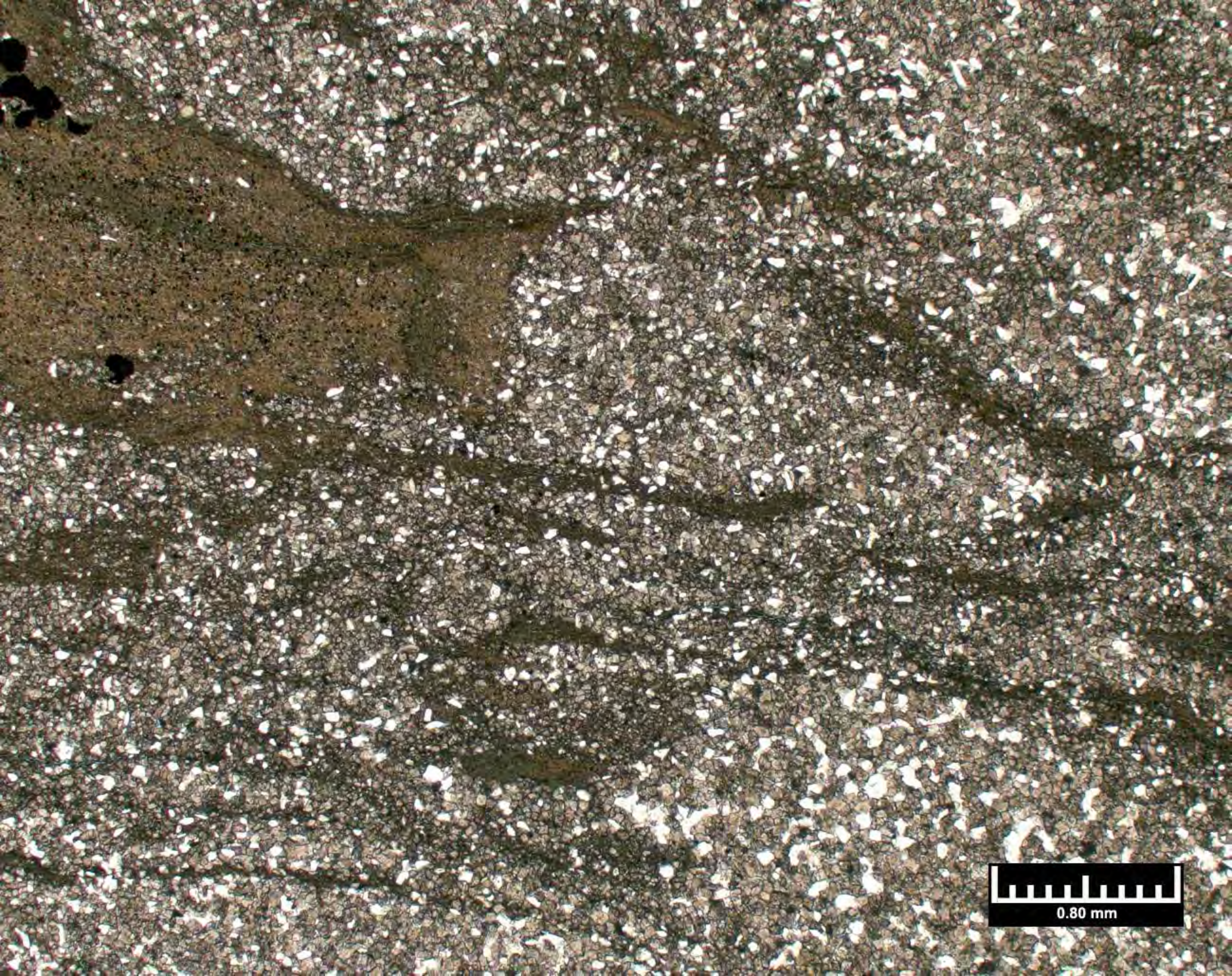
Grains: Abundant, dominantly subangular to angular siliciclastic grains range from silt- to very fine sand-size (up to 0.12 mm; upper very fine sand); estimated average grain size = 0.07 mm; monocrystalline quartz (C2.5, photo B) > feldspar (G-H7, photo B; potassium feldspar > plagioclase) > polycrystalline quartz > muscovite (G-H13, photo B) > chert, heavy minerals (titanium oxide, zircon); common, variably sized, often elongate or tabular mudstone rip-up clasts (B14,F2,H-J7, photo A; C10,J2, photo B); sparsely scattered very small dolomicritic clasts/peloids; locally discernible relict grains visible due to subround patterns of replacement dolomite crystals (H11,H-J10, photo A)

Matrix: Difficult to discern due to extensive dolomitization; appears irregularly distributed, mostly occurring within wispy argillaceous laminations (G-H13,J5.5, photo A); composed of remnant detrital clay that has been partially replaced by very fine to fine crystalline dolomite

Cements and Replacement Minerals: Extensive replacement of matrix, precursor carbonate grains, and rip-up clasts by very fine to medium crystalline, dominantly anhedral to subhedral dolomite (brownish gray; A-B14,D5.5,K10, photo B); sparsely scattered small crystals of disseminated replacement pyrite, with a few localized concentrations of larger replacement pyrite crystals that appear mostly associated with mudstone rip-up clasts or argillaceous laminations; erratically developed quartz overgrowths have filled intergranular pores between adjacent quartz grains or have filled pores between quartz grains and dolomite crystals (G-H11,H4.5,K2, photo B)

Pore System: Dominantly subequal amounts of poorly developed very small intercrystalline/intergranular pores that are erratically distributed, occurring between dolomite crystals and/or siliciclastic grains (D-E5,F-G4, photo B), and micropores that mostly occur within altered/partially leached argillaceous rip-up clasts (bluish hue; A6,B-C11.5, photo B) and also within clays present in dolomite intercrystalline areas (D2.5,E-F7,J14.5, photo B) and small dolomicritic grains; a very minor amount of small secondary intraparticle pores result from the partial leaching of siliciclastic grains (mostly feldspar; H6.5, photo B)

Magnification: A: 50X B: 200X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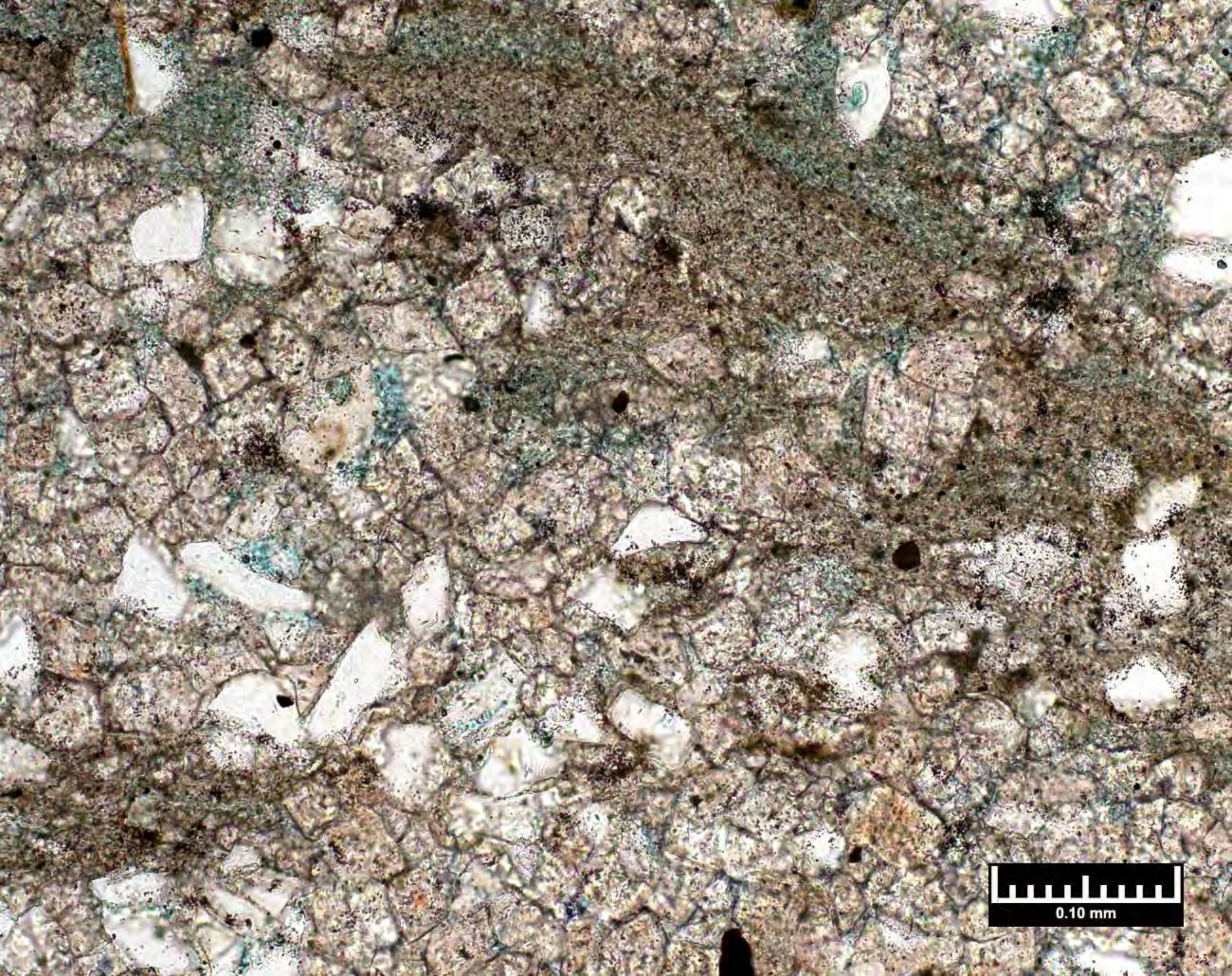
0.10 mm

Weatherford LABORATORIES

G3 Operating, LLC
Muller #1-21-16H Well
Climax Field
Williams County, North Dakota

CO-51887

Weatherford LABORATORIES

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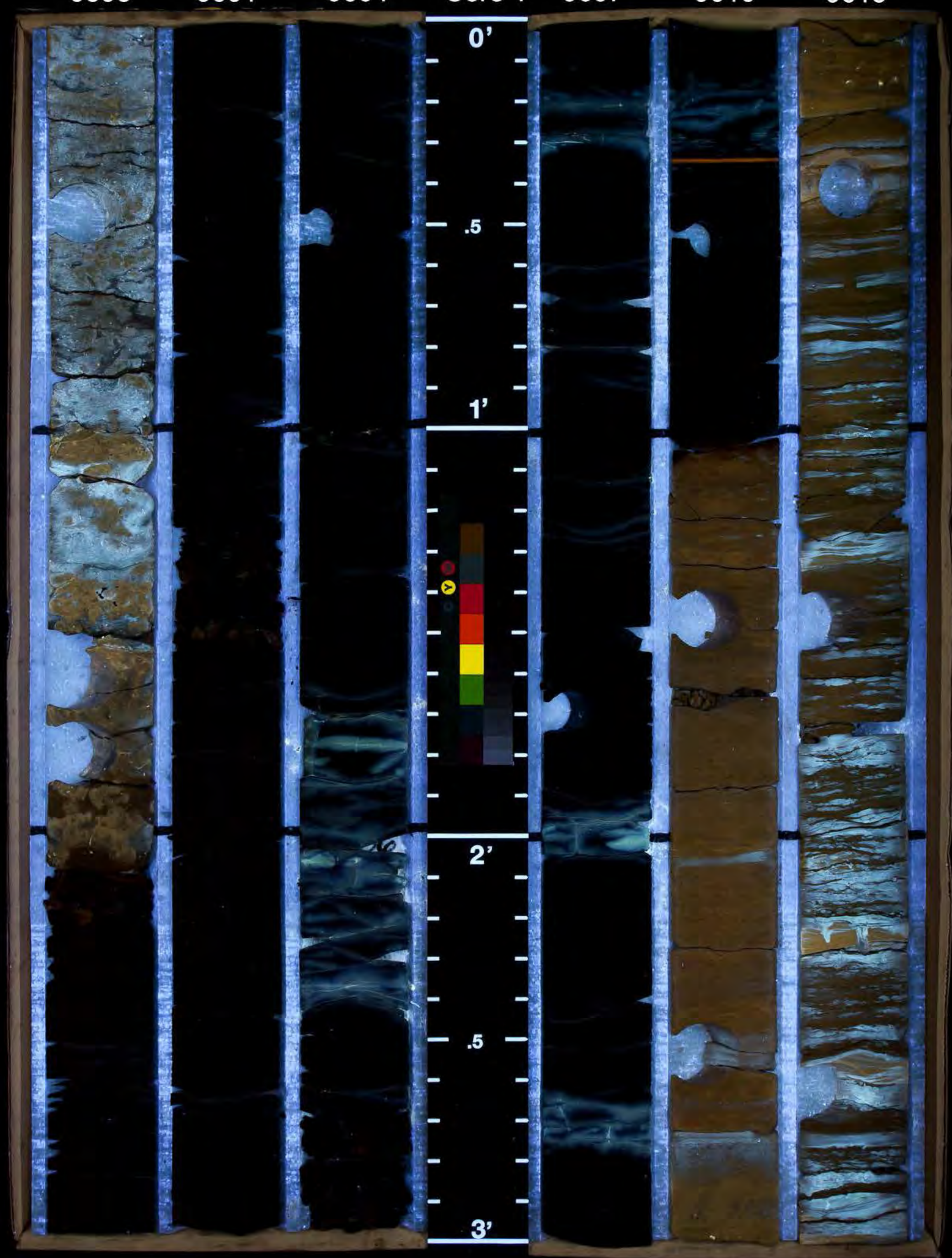

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Climax Field
Williams County, North Dakota

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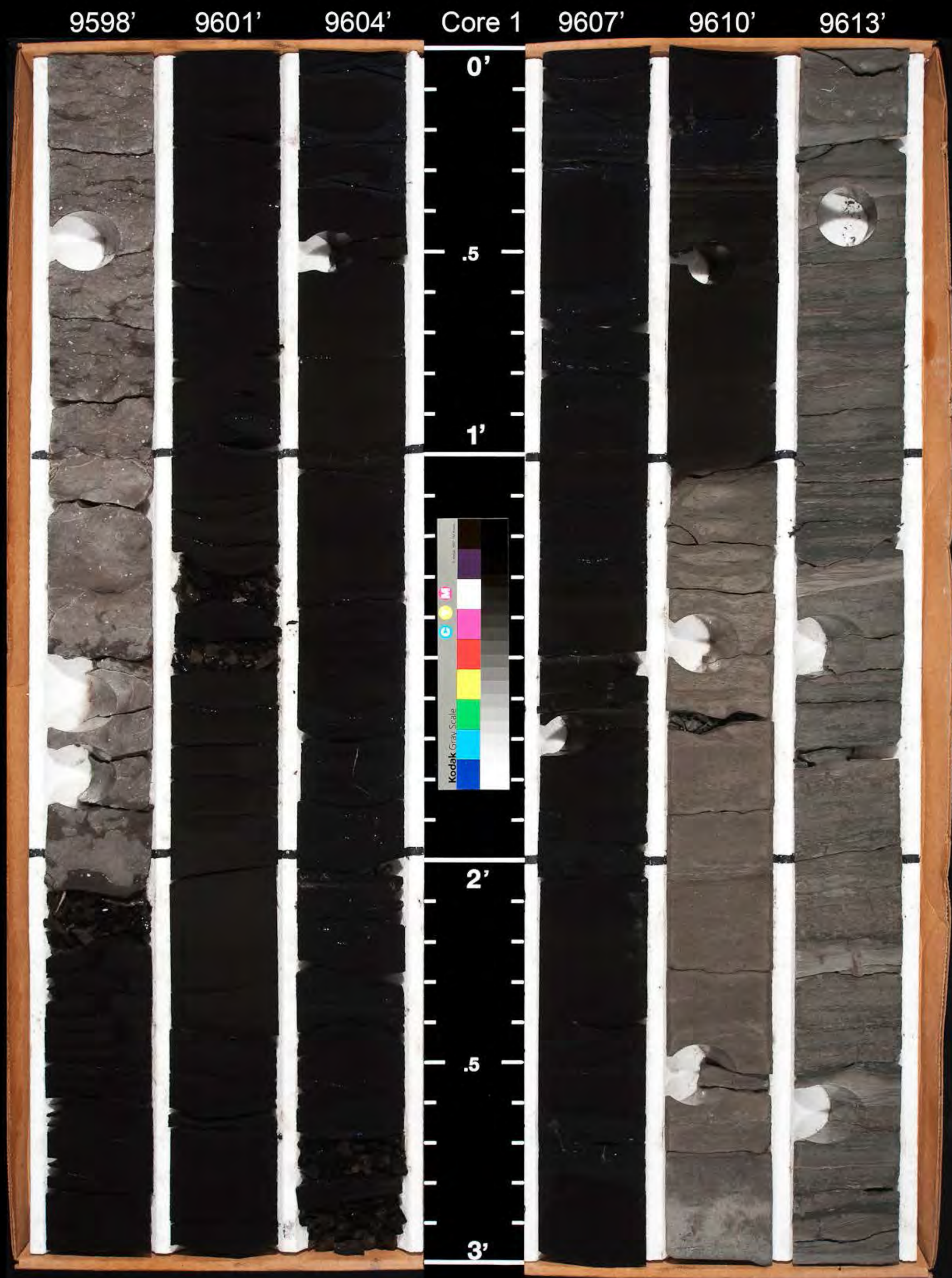

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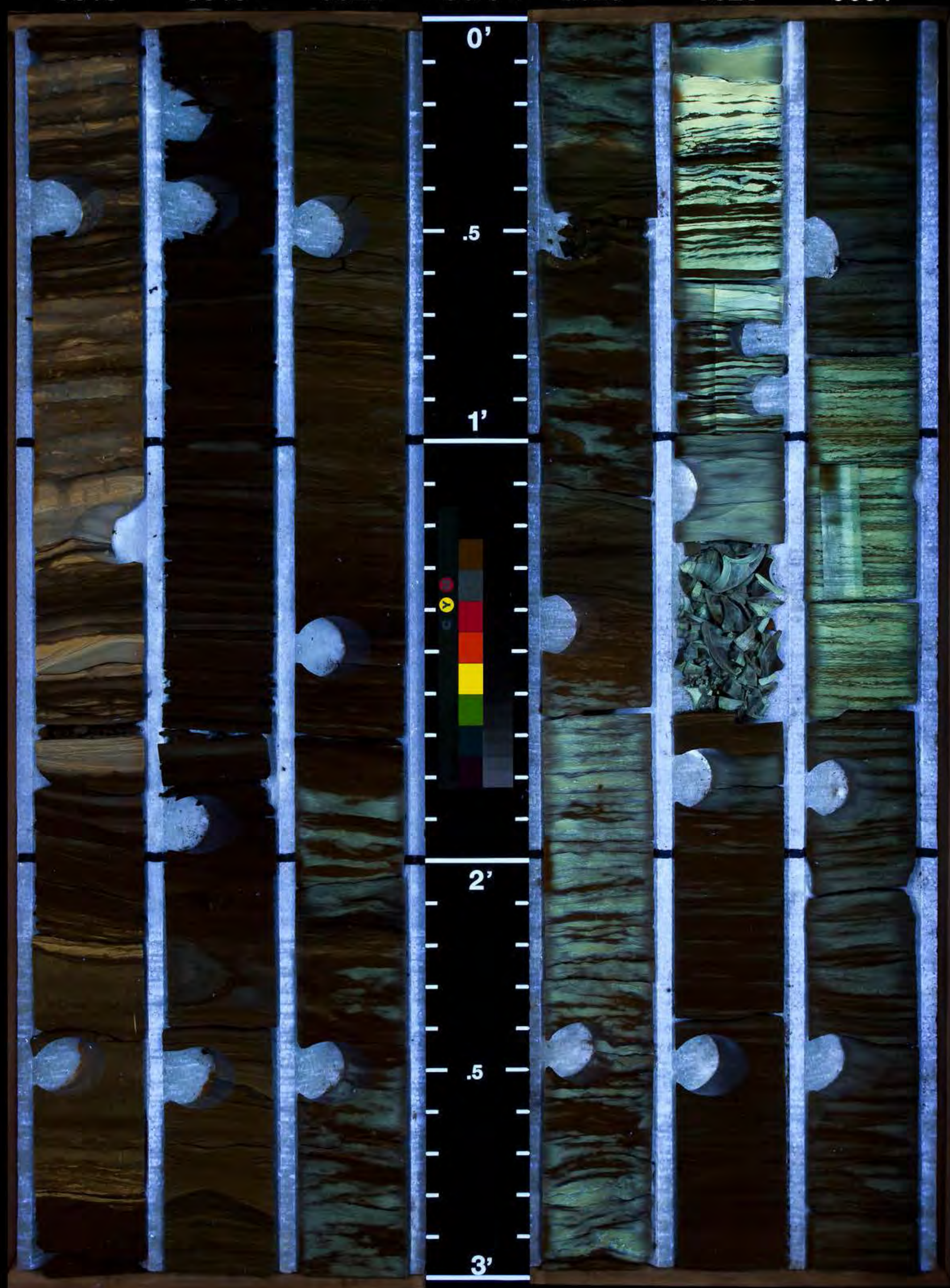

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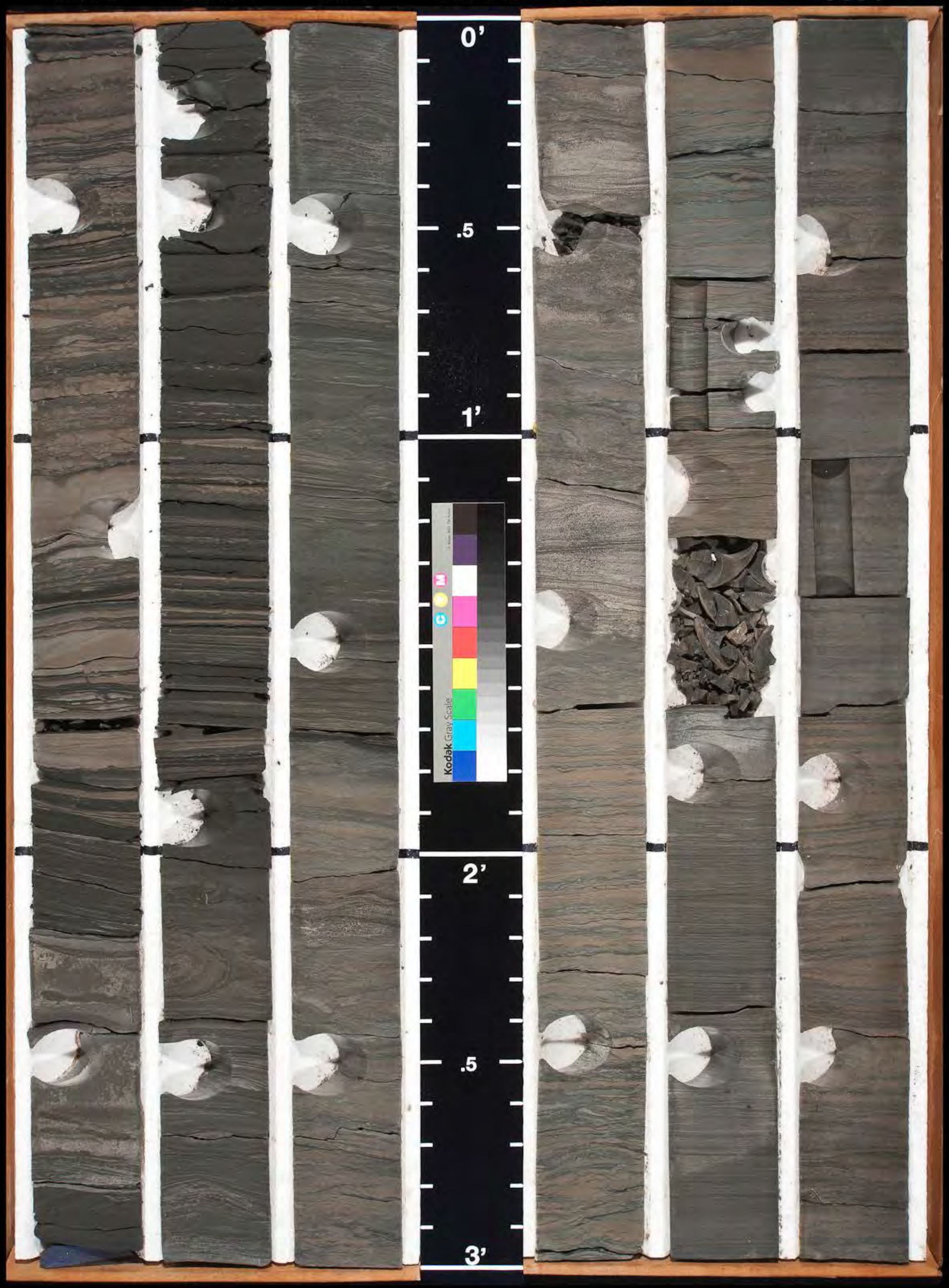

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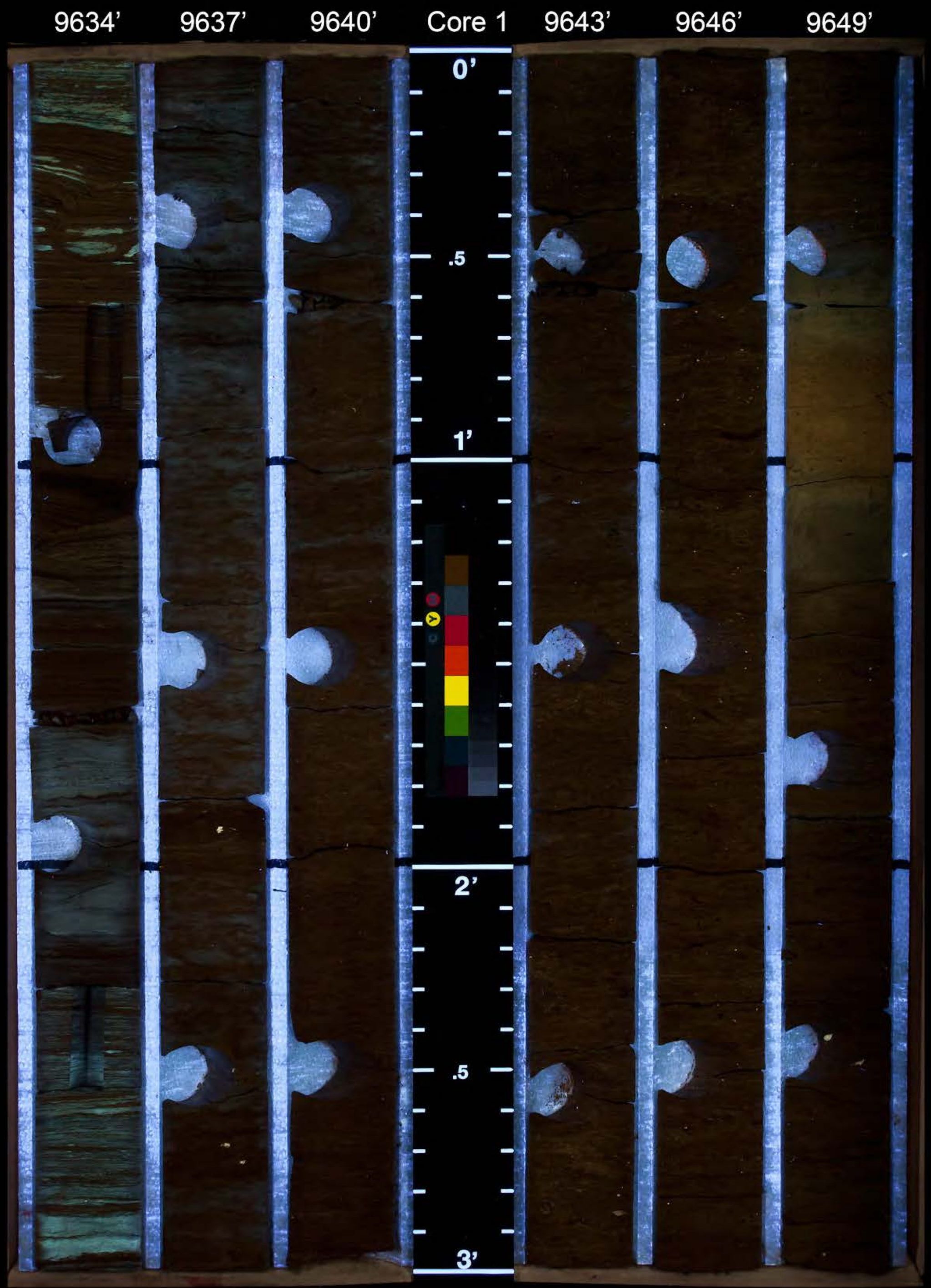

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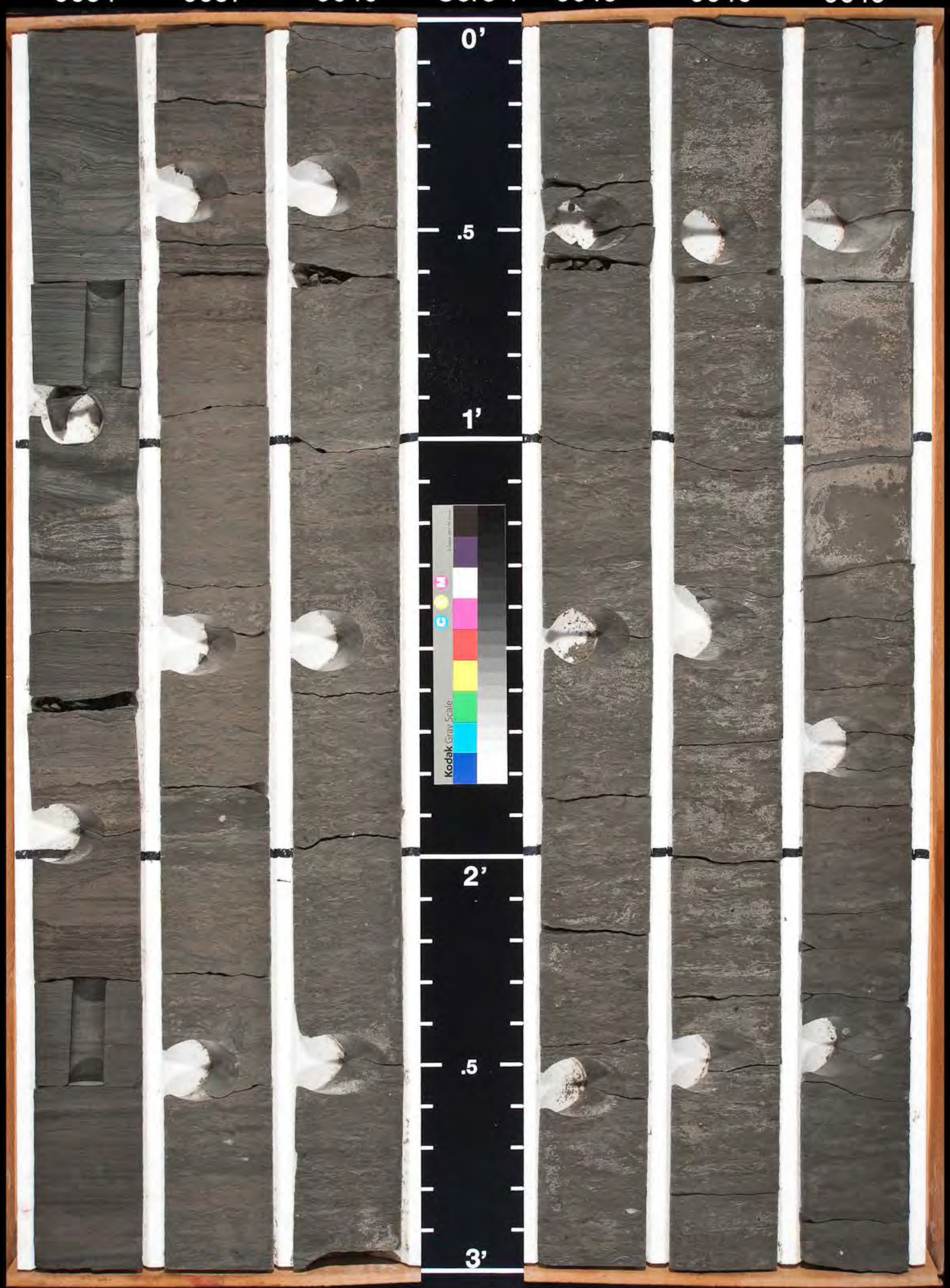

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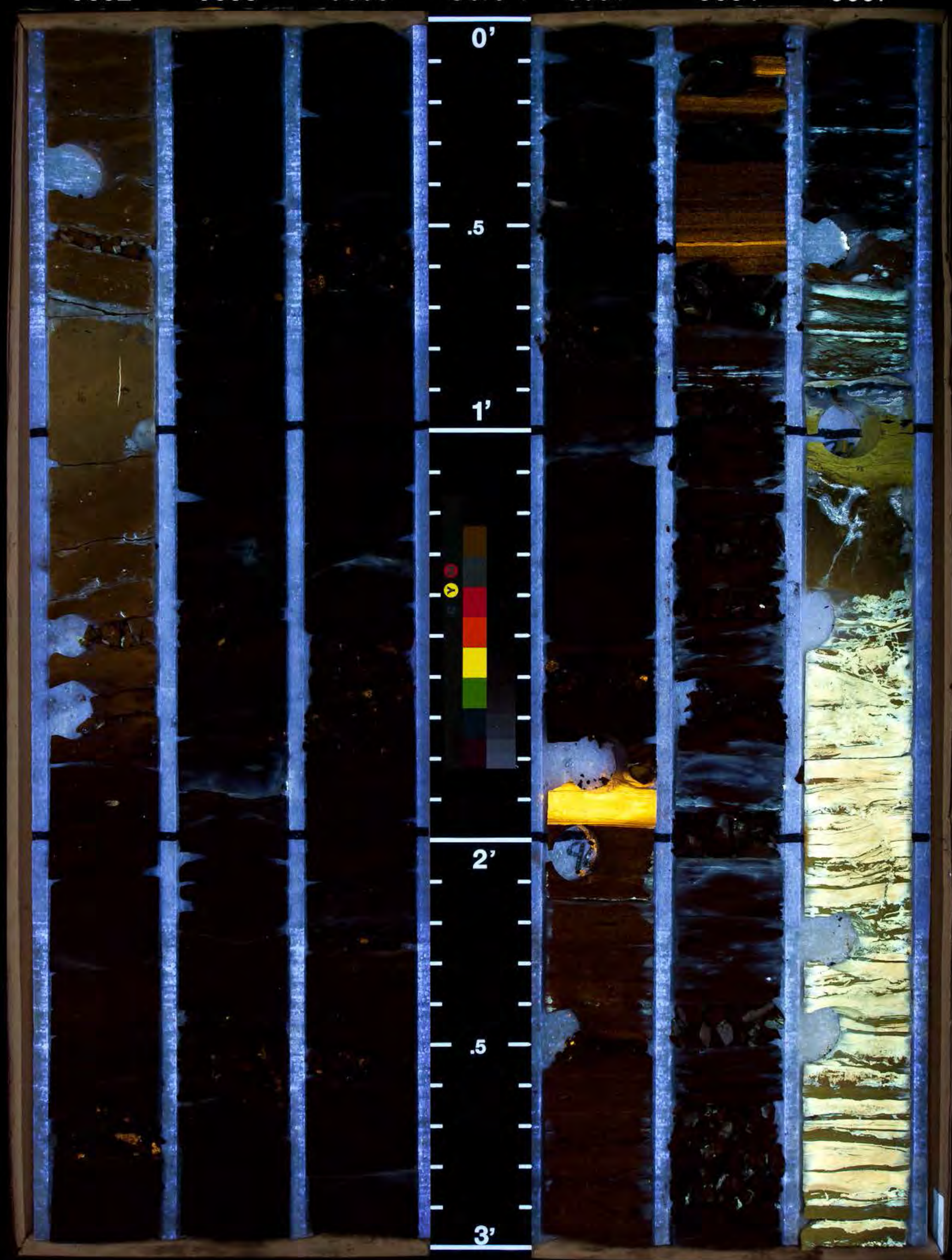

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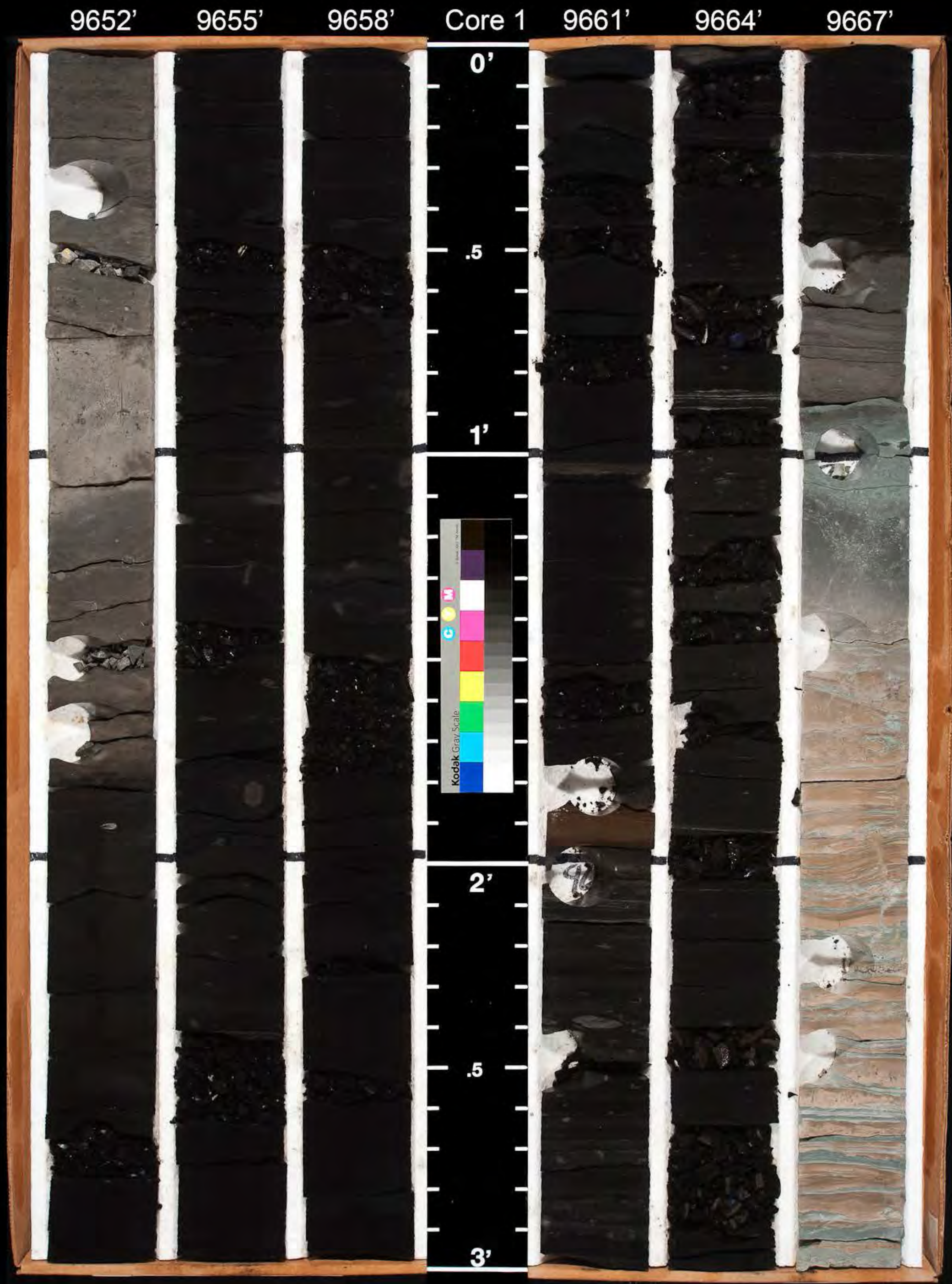

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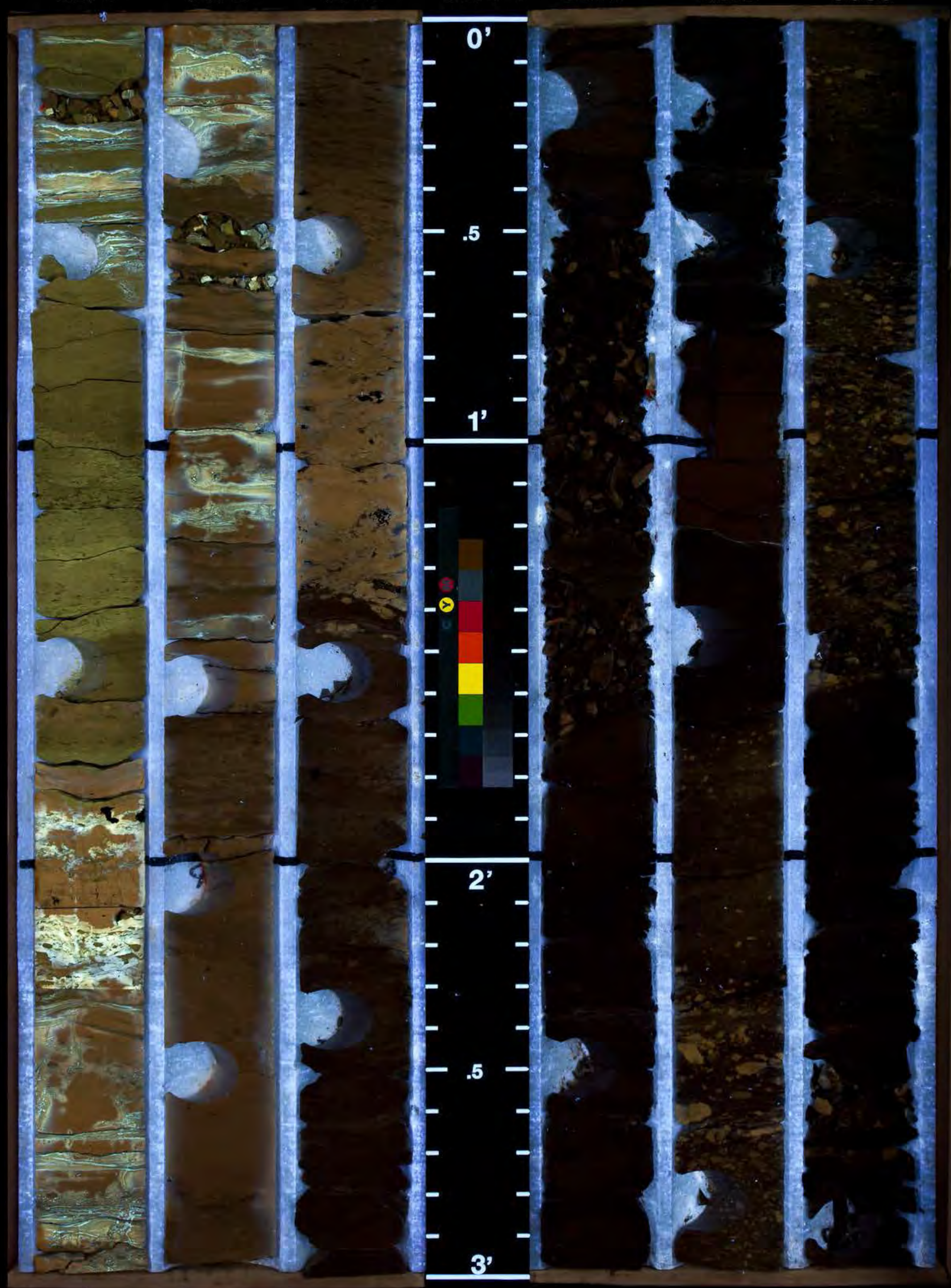

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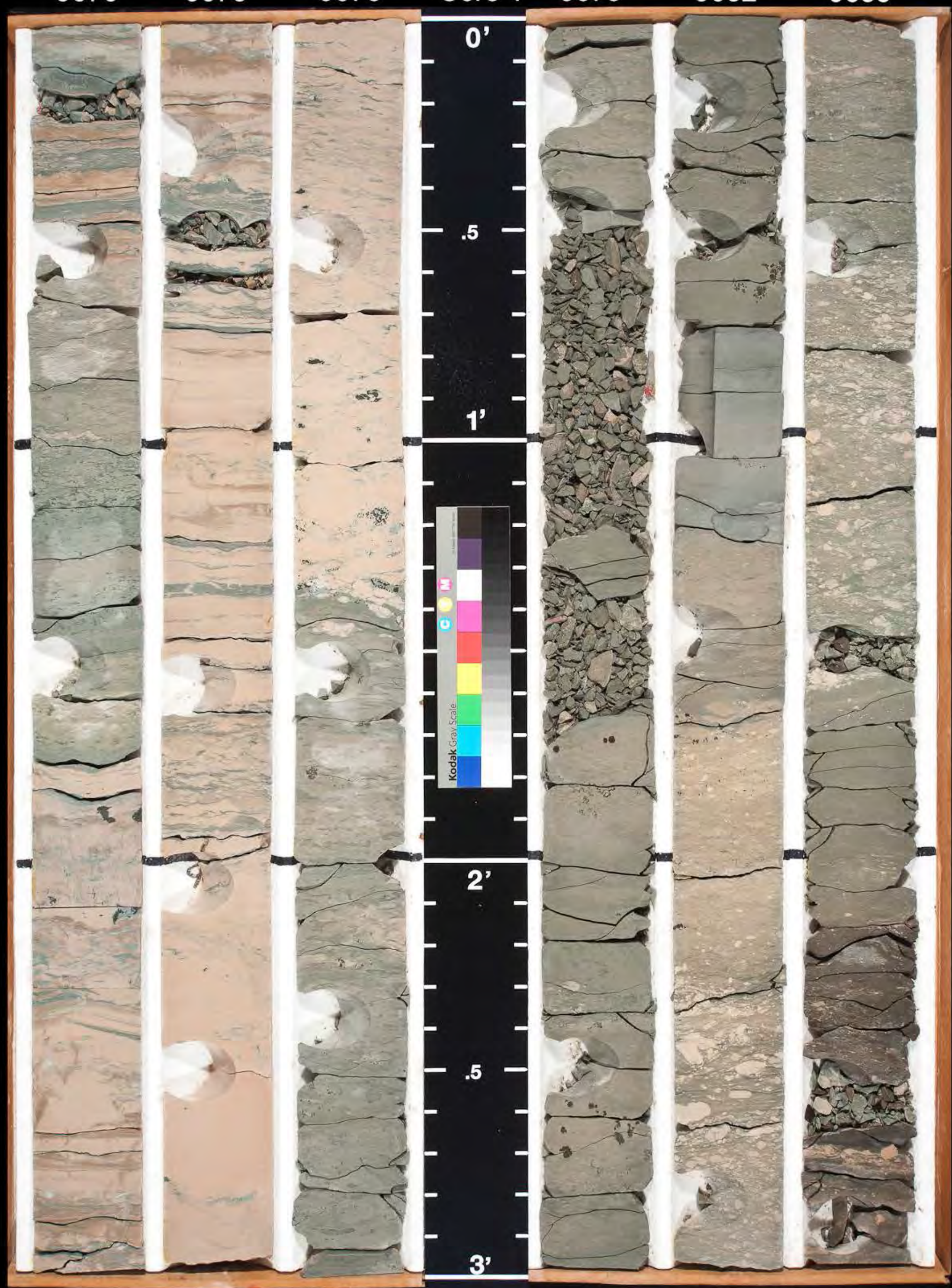

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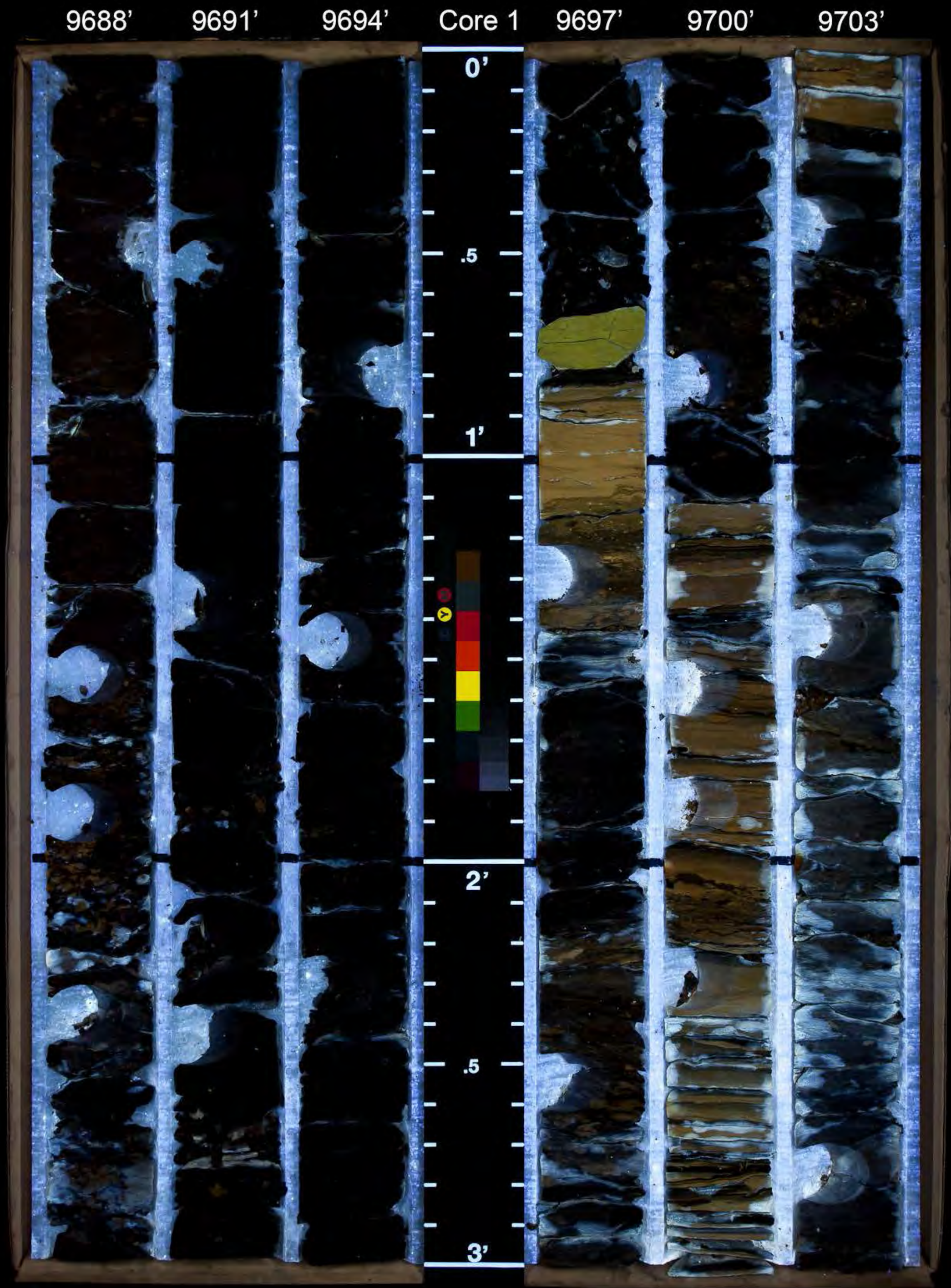

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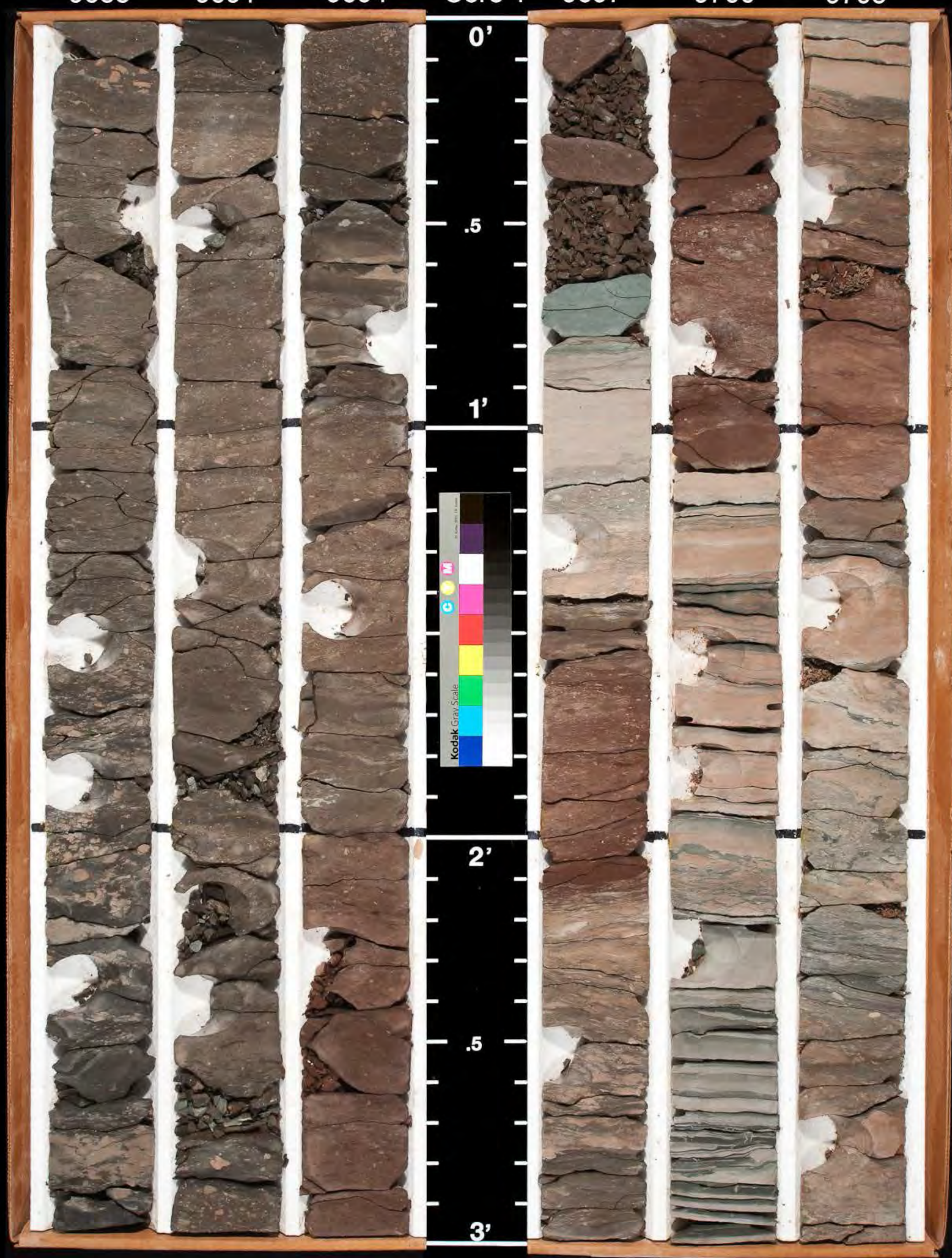

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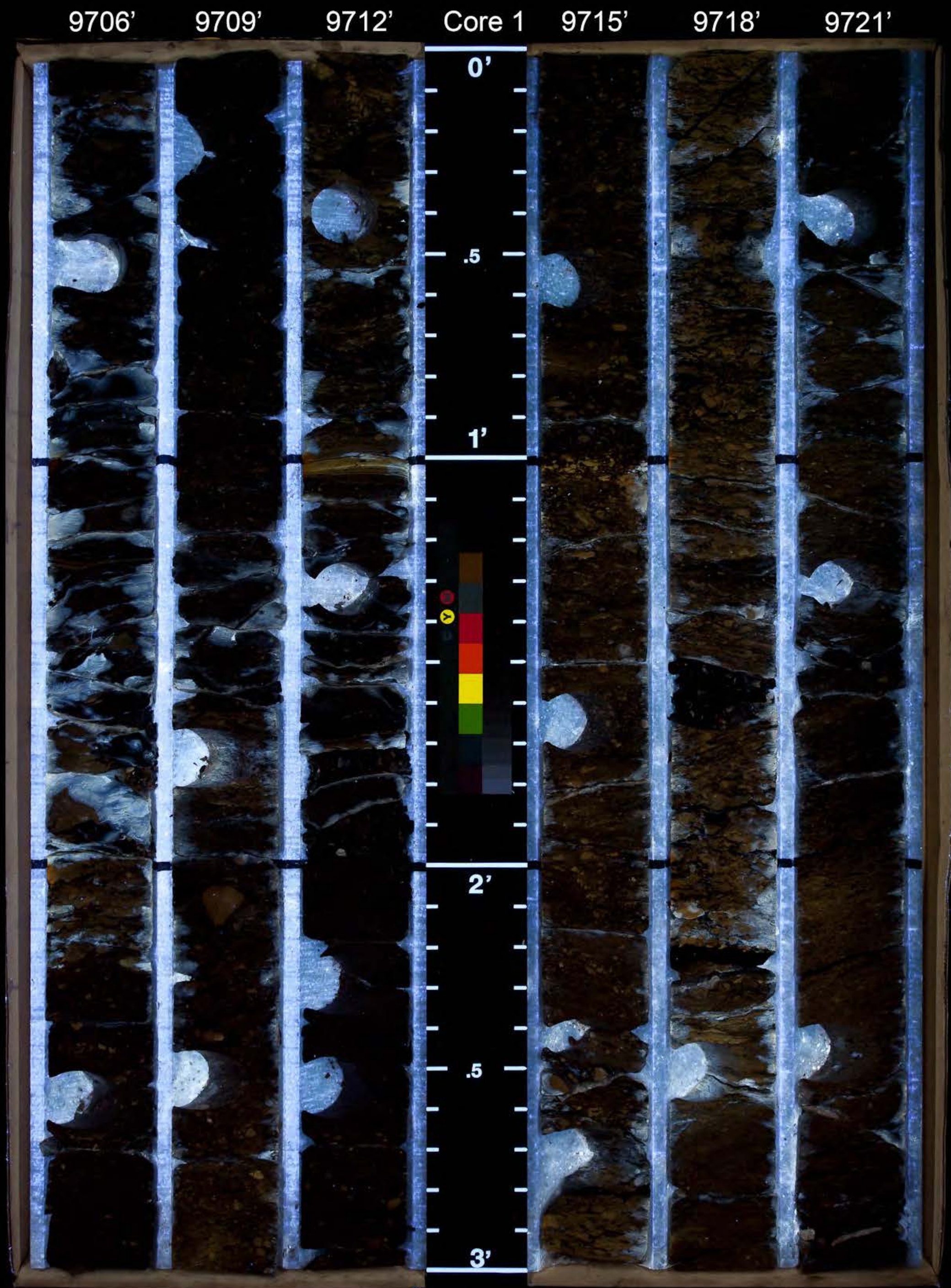

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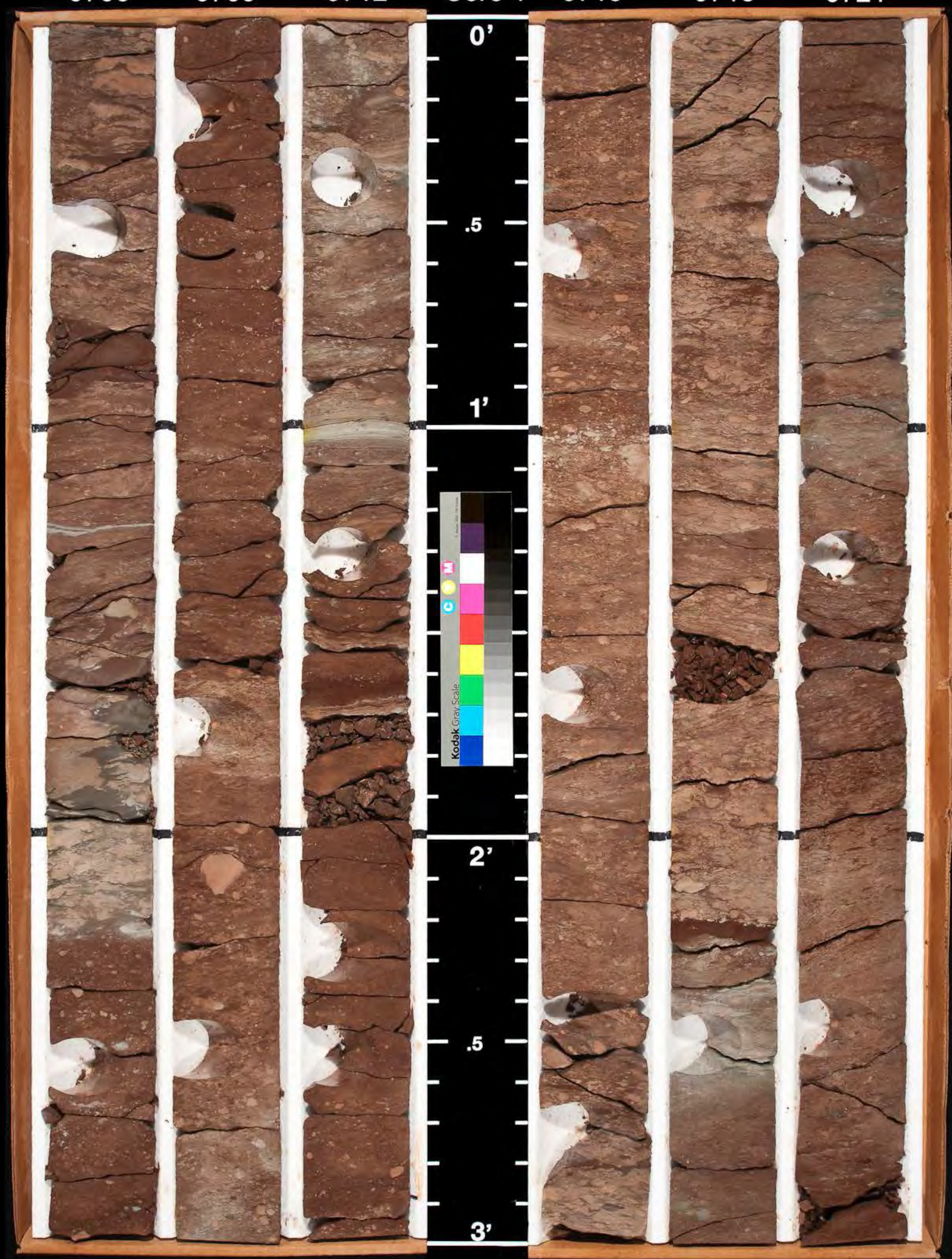

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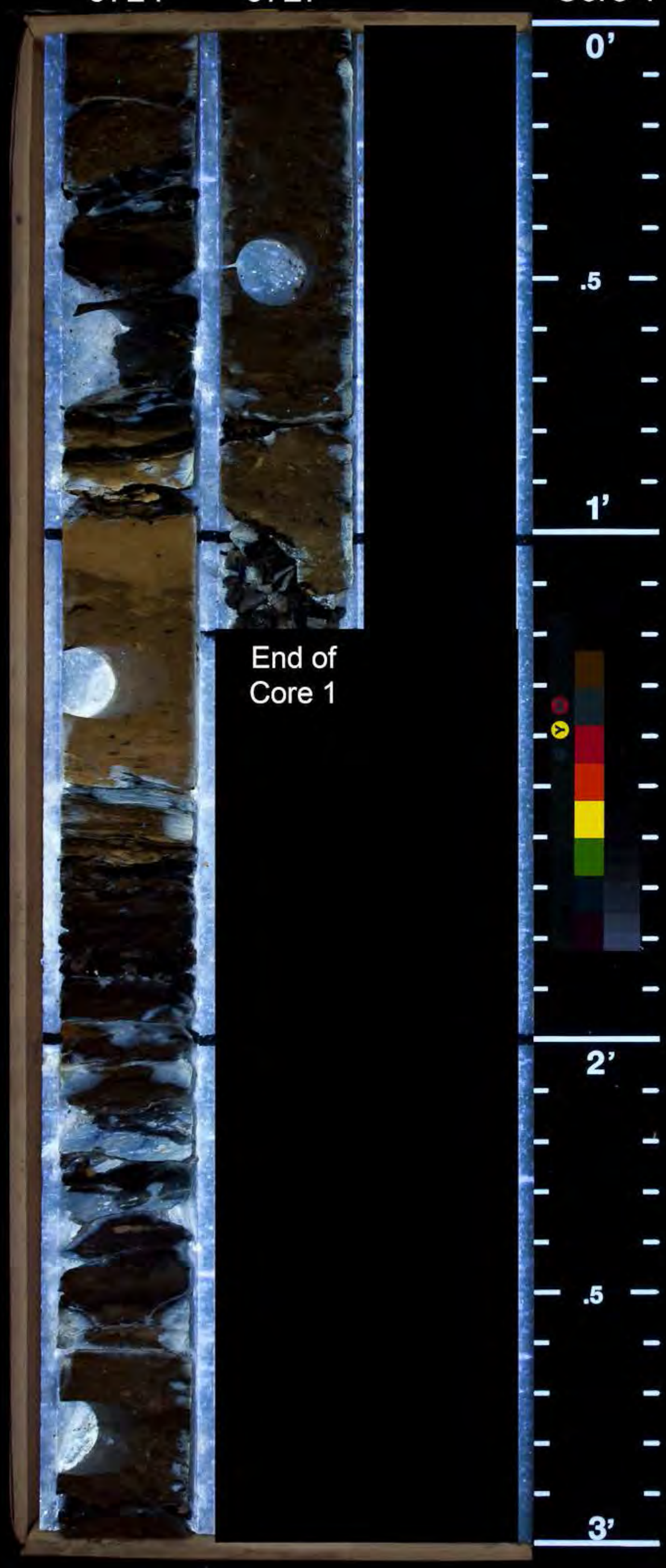

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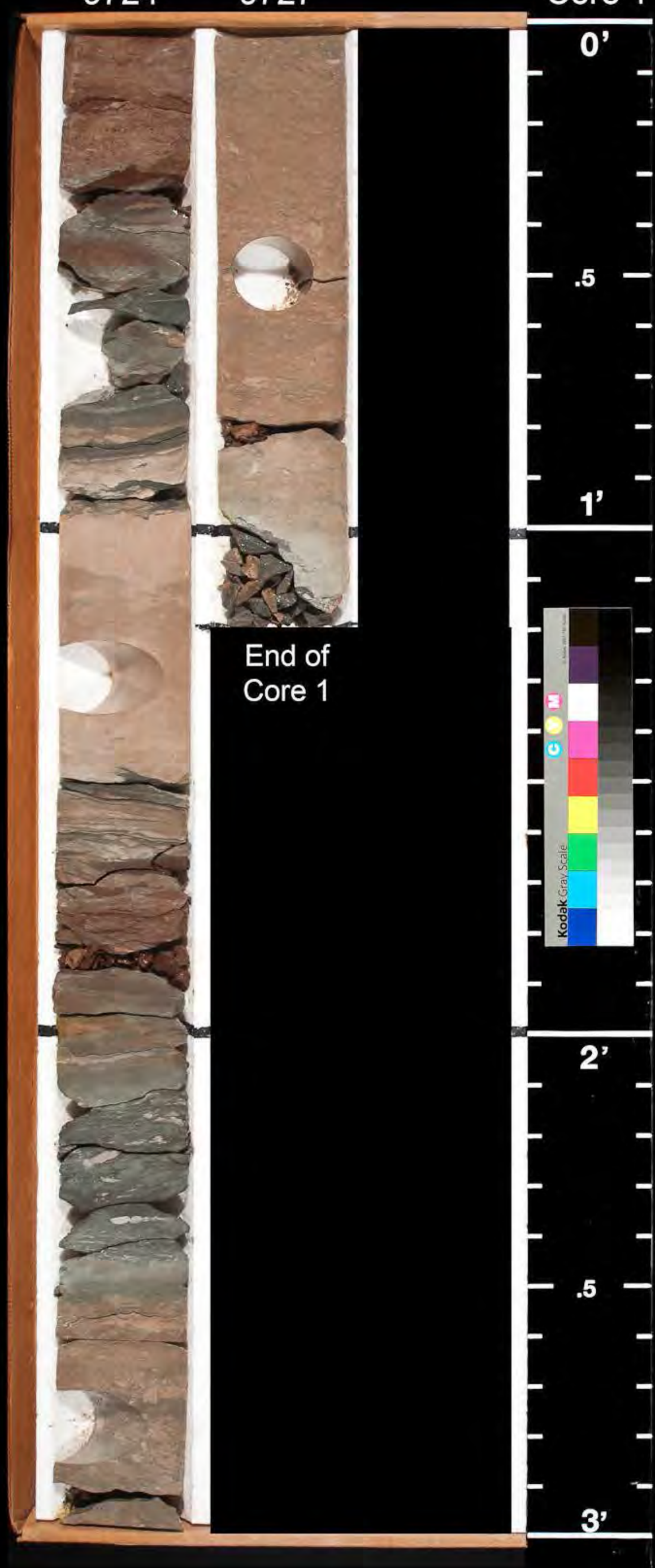


SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

JAN 2012 RECEIVED ND OIL & GAS DIVISION

Well File No. ~~20844~~ 20552

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

- ☐ Notice of Intent — Approximate Start Date
- ☑ Report of Work Done — Date Work Completed: **December 27, 2011**
- ☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03. — Approximate Start Date

- ☐ Drilling Prognosis
- ☐ Spill Report
- ☐ Redrilling or Repair
- ☐ Shooting
- ☐ Casing or Liner
- ☐ Acidizing
- ☐ Plug Well
- ☐ Fracture Treatment
- ☐ Supplemental History
- ☐ Change Production Method
- ☐ Temporarily Abandon
- ☐ Reclamation
- ☑ Other: **Wellbore Diagram**

Well Name and Number					
Muller 1-21-16H					
Footages	Qtr-Qtr	Section	Township	Range	
300 F N L 1270 F W L	SWSW	21	158 N	103 W	
Field	Pool	County			
Climax	~~Middle~~ Bakken	Williams			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

Attached is the wellbore diagram.

Company		Telephone Number
G3 Operating, LLC		**(303) 297-2028**
Address: **475 17th Street, Ste 1210**		
City: **Denver**	State: **CO**	Zip Code: **80202**
Signature: Lacy Herbison	Printed Name: **Lacy Herbison**	
Title: **Operation Tech**	Date: **December 27, 2011**	
Email Address: **lherbison@g3operating.com**		

FOR STATE USE ONLY

- ☒ Received
- ☐ Approved

Date: 1-10-12

By: Nathaniel Erbele

Title: Petroleum Resource Specialist

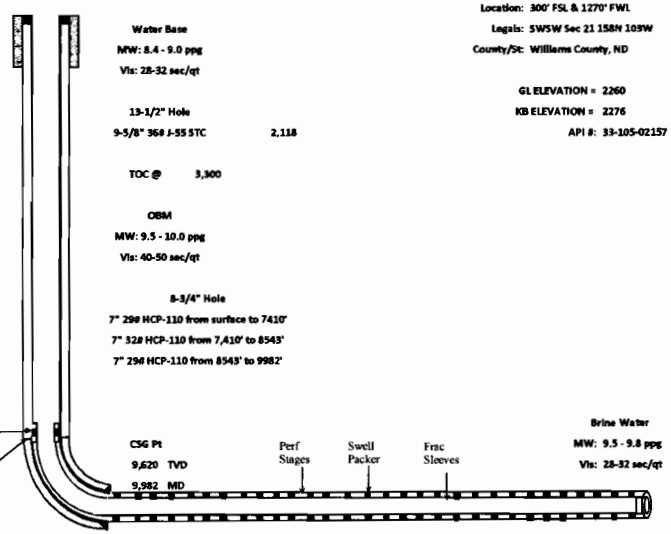
G3 OPERATING, LLC
Oil & Gas Exploration and Production

Muller 1-21-16H
WELLBORE DIAGRAM

Formation	TVD (ft)
Pierre/Base Foxhills	1,720
Greenhorn	4,420
Dakota (marine)	5,290
Rierdon	6,130
Spearfish	6,700
Minnelusa	7,060
Otter	7,490
Kibbey Lime	7,800
Charles Salt	7,925
Base last Charles Salt	8,222
Mission Canyon	8,417
Lodgepole	9,095
Upper Bakken Shale	9,600
Top of Target	9,612
Target	9,628
Base of Target	9,643

Location: 300' FSL & 1270' FWL
Legals: SWSW Sec 21 158N 103W
County/St: Williams County, ND

GL ELEVATION = 2260
KB ELEVATION = 2276
API #: 33-105-02157



6" Hole		Lateral MTD @	19,333
9814.83	4-1/2" 13.5# P-110 BTC	Lateral TVD @	9,516
38	Swell Packers	Ft of Open Hole	9,351
0	Frac Sleeves		
19300	End of Liner		

Tubing Summary:

Description	OD (inch)	Grade	Bottom MD (FT)
282 jts	2.875	L-80	8834.14
Carb TAC	7.000		8836.49
Tubing Sub	2.875	L-80	8840.77
Tub Pump Barrel 2 1/4"	2.875		8871.40
Mech Seating Nipple w/Diptube	2.500		8871.75
Tubing Sub	2.875	L-80	8876.03
Xover	2.875		8876.31
Gas Anchor	4.500		8921.75
Blow Plug	4.500		8922.10

Rod Summary:

Description	Number	Grade
1 1/2" K-Bars	16	E
3/4" Sucker Rod	93	E
7/8" Sucker Rod	135	E
1" Sucker Rod	124	E
1 1/2" x 36" Polished Rod	1	G

Pump Summary: Weatherford, Pump # ww2741, 2 1/4 pluger

Plug/Perf Info:

Packer Depth (ft)	Stage #	CFP set @	Perf Intervals:	SPF	Phasing	Disp top plug (bbls)	Stage Interval	
19,060	1		19,155 / 19,107	6	60	0	273.00	68
18,831	2	19036.00	18,990 / 18,945 / 18,899 / 18853	6	60	284	229.00	57
18,602	3	18807.00	18,761 / 18,716 / 18,670 / 18,625	6	60	281	229.00	57
18,329	4	18578.00	18,528 / 18,467 / 18,412 / 18,357	6	60	277	273.00	68
18,102	5	18305.00	18,260 / 18,215 / 18,170 / 18,125	6	60	273	227.00	57
17,875	6	18078.00	18,033 / 17,988 / 17,945 / 17,898	6	60	270	227.00	57
17,603	7	17851.00	17,796 / 17,741 / 17,686 / 17,631	6	60	266	272.00	68
17,378	8	17579.00	17,534 / 17,490 / 17,445 / 17, 400	6	60	262	225.00	56
17,149	9	17354.00	17,308 / 17,263 / 17,217 / 17,172	6	60	259	229.00	57
16,877	10	17125.00	17,070 / 17,015 / 16,960 / 16,905	6	60	256	272.00	68
16,648	11	16853.00	16,807 / 16,762 / 16,716 / 16,671	6	60	251	229.00	57
16,376	12	16624.00	16,569 / 16,514 / 16,459 / 16,404	6	60	248	272.00	68
16,146	13	16352.00	16,306 / 16,260 / 16,215 / 16,169	6	60	244	230.00	58
15,918	14	16122.00	16,077 / 16,031 / 15,986 / 15,941	6	60	241	228.00	57
15,648	15	15894.00	15,839 / 15,785 / 15,730 / 15,675	6	60	237	270.00	68
15,419	16	15624.00	15,578 / 15,533 / 15,487 / 15,442	6	60	233	229.00	57
15,152	17	15395.00	15,341 / 15,287 / 15,233 / 15,179	6	60	230	267.00	67
14,923	18	15128.00	15,082 / 15,037 / 14,991 / 14,946	6	60	226	229.00	57
14,651	19	14899.00	14,844 / 14,789 / 14,734 / 14,679	6	60	222	272.00	68

Packer Depth (ft)	Stage #	CFP set @	Perf Intervals:	SPF	Phasing	Disp top plug (bbls)	Stage Interval	
14,423	20	14627.00	14,582 / 14,536 / 14,491 / 14,446	6	60	218	228.00	57
14,195	21	14399.00	14,354 / 14,308 / 14,263 / 14,218	6	60	215	228.00	57
13,925	22	14171.00	14,118 / 14,062 / 14,007 / 13,952	6	60	211	270.00	68
13,698	23	13901.00	13,856 / 13,811 / 13,766 / 15,721	6	60	207	227.00	57
13,470	24	13674.00	13,629 / 13,583 / 13,538 / 13,493	6	60	204	228.00	57
13,197	25	13446.00	13,591 / 13,335 / 13,280 / 13,225	6	60	201	273.00	68
12,969	26	13173.00	13,128 / 13,082 / 13,037 / 12,992	6	60	197	228.00	57
12,696	27	12945.00	12,890 / 12,834 / 12,779 / 12,724	6	60	193	273.00	68
12,466	28	12672.00	12,626 / 12,580 / 12,535 / 12,489	6	60	189	230.00	58
12,238	29	12442.00	12,393 / 12,351 / 12,306 / 12,281	6	60	186	228.00	37
11,966	30	12214.00	12,159 / 12,104 / 12,049 / 11,994	6	60	182	272.00	68
11,737	31	11942.00	11,896 / 11,851 / 11,805 / 11,760	6	60	178	229.00	57
11,508	32	11715.00	11,667 / 11,622 / 11,576 / 11,351	6	60	175	229.00	57
11,235	33	11484.00	11,429 / 11,373 / 11,518 / 11,263	6	60	171	273.00	68
11,006	34	11211.90	11,165 / 11,120 / 11,074 / 11,029	6	60	167	229.00	57
10,733	35	10982.00	10,927 / 10,871 / 10,816 / 10,761	6	60	164	273.00	68
10,504	36	10709.00	10,663 / 10,818 / 10,572 / 10,527	6	60	160	229.00	57
10,275	37	10480.00	10,434 / 10,389 / 10,343 / 10, 298	6	60	156	229.00	57
10,046	38	10251.00	10,205 / 10,160 / 10,114 / 10,069	6	60	153	229.00	57

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

DEC 2011 RECEIVED ND OIL & GAS DIVISION

Well File No. **20552**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☐ Notice of Intent	Approximate Start Date
☑ Report of Work Done	Date Work Completed: **October 31, 2011**
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date

☐ Drilling Prognosis	☐ Spill Report
☐ Redrilling or Repair	☐ Shooting
☐ Casing or Liner	☐ Acidizing
☐ Plug Well	☐ Fracture Treatment
☐ Supplemental History	☐ Change Production Method
☐ Temporarily Abandon	☐ Reclamation
☑ Other **Reserve Pit Reclamation-Complete**	

Well Name and Number					
Muller 1-21-16H					
Footages	Qtr-Qtr	Section	Township	Range	
300 F S L 1270 F W L	**SWSW**	**21**	**158 N**	**103 W**	
Field	Pool	County			
Climax	**Bakken**	**Williams**			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Concord Field Services, LLC			
Address	City	State	Zip Code
P.O. Box 136	**Culbertson**	**MT**	**59208**

DETAILS OF WORK

G3 Operating, LLC has completed the reserve pit reclamation for the above referenced well. The proposed work plan previously approved by the NDIC was followed:

The NDIC field inspector, John Axtman, and the landowners were notified before work began. Fluids from the pit were hauled to the SWD well operated by G3 Operating, LLC. Fly ash was mixed in with pit cuttings to solidify the contents. The area was covered with four feet of soil and them compacted. The surface area was sloped to promote proper drainage.

Company: **G3 Operating, LLC**		Telephone Number: **(303) 279-2028**
Address: **475 17th St Suite 1210**		
City: **Denver**	State: **Co**	Zip Code: **80202**
Signature: Lacy Herbison	Printed Name: **Lacy Herbison**	
Title: **Operations Tech**	Date: **December 9, 2011**	
Email Address: **lherbison@g3operating.com**		

FOR STATE USE ONLY

☒ Received	☐ Approved
Date: 12-15-11	
By: Carl Vandell	
Title:	

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

OCT 2011 RECEIVED ND OIL & GAS DIVISION

Well File No. **20552**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☐ Notice of Intent	Approximate Start Date
☑ Report of Work Done	Date Work Completed: **August 26, 2011**
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date

☐ Drilling Prognosis	☐ Spill Report
☐ Redrilling or Repair	☐ Shooting
☐ Casing or Liner	☐ Acidizing
☐ Plug Well	☐ Fracture Treatment
☐ Supplemental History	☑ Change Production Method
☐ Temporarily Abandon	☐ Reclamation
☐ Other	

Well Name and Number					
Muller 1-21-16H SWSW					
Footages	Qtr-Qtr	Section	Township	Range	
300 F ~~N~~ S L 1270 F ~~E~~ W L	~~SESW~~	21	158 N	103 W	
Field	Pool	County			
~~Wildcat~~ Climax	Bakken	Williams			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Dirt Contractor: Concord Field Services			
Address	City	State	Zip Code
7901 Shaffer Parkway	**Littleton**	**CO**	**81027**

DETAILS OF WORK

G3 Operating has changed production method to the following:

Tubing Summary: 282 jts L-80 8rd eue @8834 MD, 7" Carb TAC @ 8836, 2 7/8" L-80 8RD eue sub @ 8841, 2 1/4" TBG BBL @8871, 2 1/2" Mech SN w/Diptube @8872, 2 7/8" sub L-80 8rd eue @8876.03, 4 1/2" x 2 7/8 " XCover @ 8876.31, 4 1/2" Gas Anchor @8922, 4 1/2" Blow Plug @8922.

Rod Summary: PR 1 1/2" x 36', 1" x 2', 134 - 1", 126 - 7/8", 73 - 3/4", 20 K-Bars.

Pump Data: Weatherford Pump #ww2741, 2 1/4 plunger

Company: **G3 Operating, LLC.**		Telephone Number: **(303) 297-2028**
Address: **475 17th Street, Suite 1210**		
City: **Denver**	State: **CO**	Zip Code: **80202**
Signature:	Printed Name: **Lacy Herbison**	
Title: **Operation Tech**	Date: **October 12, 2011**	
Email Address: **lherbison@g3operating.com**		

FOR STATE USE ONLY

☑ Received	☐ Approved
Date: October 17, 2011	
By: Daniel L. McCusker	
Title: PETROLEUM ENGINEER	

20552
TH

GAS-OIL RATIO REPORT - FORM 9

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5755 (01-2008)

SEP 2011 RECEIVED ND OIL & GAS DIVISION

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL.

Field	Pool		
Climax	**Bakken**		
Operator: **G3 Operating, LLC**			Telephone Number: **303-297-2028**
Address: **475 17th St, Ste. 1210**	City: **Denver**	State: **CO**	Zip Code: **80202**
Required Test ☑ Special Test ☐ Reason **New completion**	Equipment Used **2" meter run w/ a Scanner 2000 Dri Flow meter 300 psi x 200" WC**		

ALL VOLUMES MUST BE CORRECTED TO 14.73 PSIA AND 60 DEGREES F.

Well Name and Number	Well File Number	Date of Test	Production Method	Test Hours	Production For Test Oil (Bbls)	Water (Bbls)	Gas (MCF)	GOR
Muller 1-21-16H	**20552**	**9/2/2011**	**pumping unit**	**24**	**216**	**674**	**103**	**477**

Name(s) of Person(s) Witnessing Above Tests	Name of Company or Operator
Luke Fell	**Double (EE) Service, Inc.**

Comments

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. Date: **September 23, 2011**

Signature	Printed Name	Title
Kenny Simmons	**Kenny Simmons**	**Production Foreman**

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
Connie Hval	**Connie** Hval	**Production Analyst**

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

AUG 2011 RECEIVED ND OIL & GAS DIVISION

TH

Well File No. **20552**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☐ Notice of Intent	Approximate Start Date	☐ Drilling Prognosis	☐ Spill Report
☑ Report of Work Done	Date Work Completed **August 10, 2011**	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other **Oil-Gas-Water Analysis**	

Well Name and Number					
Muller 1-21-16H SWSW					
Footages	Qtr-Qtr	Section	Township	Range	
300 F ~~N~~ S L **1270** F ~~E~~ W L	~~SESW~~	**21**	**158 N**	**103 W**	
Field	Pool	County			
~~Wildcat~~ Climax	**Bakken**	**Williams**			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Astro-Chem Lab, Inc.			
Address	City	State	Zip Code
4102 2nd Ave. West	**Williston**	**ND**	**58802**

DETAILS OF WORK

Please see attached Oil-Gas-Water analysis.

Company **G3 Operating, LLC**		Telephone Number **303-297-2028**
Address **475 17th Street, Ste 1210**		
City **Denver**	State **CO**	Zip Code **80202**
Signature Lacy Herbison	Printed Name **Lacy Herbison**	
Title **Operation Tech**	Date **August 17, 2011**	
Email Address **lherbison@g3operating.com**		

FOR STATE USE ONLY

☑ Received	☐ Approved
Date August 22, 2011	
By David J. McCusker	
Title PETROLEUM ENGINEER	

ASTRO-CHEM LAB, INC.

4102 2nd Ave. West
Williston, North Dakota 58802-0972
P.O. Box 972
Phone: (701) 572-7355

OIL ANALYSIS REPORT

SAMPLE NUMBER 0-11-3711

DATE OF ANALYSIS 7-27-11

COMPANY G3 Operating

CITY Williston

STATE ND

WELL NAME Muller 1-21-16H

DATE RECEIVED 8-9-11

DST NUMBER

AUG 2011
RECEIVED
OIL & GAS
DIVISION

SAMPLE SOURCE

FORMATION Bakken

DEPTH

LOCATION SECTION TOWNSHIP RANGE

DISTRIBUTION Double EE Service
Attn: Luke Fell

Specific Gravity	: 0.8270	at 60/60 °F
API Gravity	: 39.6	at 60 °F
Salt Content	: 6	lbs/1000 bbls
Pour Point	: <-40	°F
Viscosity	: 2.90	Kinematic cSt at 100 °F
	35.6	Saybolt Universal Seconds at 100 °F
Total Sulfur	: 0.19	% by Weight
BS&W	: 0.1	% in Gross Sample
	0.1	% in Sample as Analyzed
Paraffin	: 0.95	% by Weight

REMARKS Sampled 7-25-11

ANALYZED BY: _____

ASTRO-CHEM LAB, INC.

4102 2nd Ave. West
Williston, North Dakota 58802-0972
P.O. Box 972
Phone: (701) 572-7355

DISTILLATION REPORT

Sample Number O-11-3711 **Date Analyzed** 7/29/11

G3 Operating — Williston — ND
Source — City — State

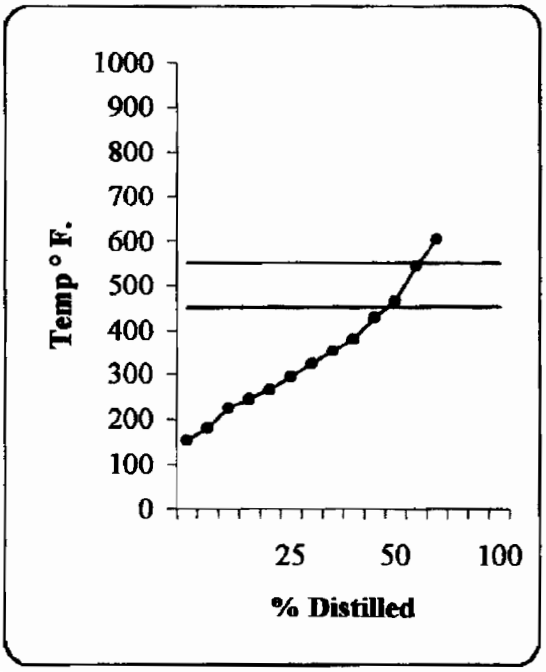
Muller 1-21-16H
Well Name — Formation — Depth

ENGLER DISTILLATION; 100 mL SAMPLE

INITIAL BOILING POINT 154° F

REMARKS:

mL Distilled	Temp ° F.	% Distilled
IBP	154	
5	182	5
10	226	10
15	245	15
20	266	20
25	295	25
30	325	30
35	354	35
40	380	40
45	428	45
50	465	50
60	545	60
70	606	70
80		80
90		90
100		100



ASTRO-CHEM LAB, INC.

4102 2nd Ave. West
Williston, North Dakota 58802-0972
P.O. Box 972
Phone: (701) 572-7355

NATURAL GAS ANALYSIS

COMPANY G3 Operating

DATE OF ANALYSIS 7-27-11

LEASE Muller 1-21-16H

DATE SAMPLED 7-25-11

TEMPERATURE °F

SAMPLE SOURCE

PRESSURE PSI

SAMPLE NUMBER G-11-3712

SAMPLED BY EE

TYPE OF ANALYSIS GAS

ANALYSIS BY BK

FORMATION Barrentoms

INTERVAL

LOCATION SECTION TOWNSHIP RANGE

DISTRIBUTION Double EE Service
Attn: Luke Fell

COMPONENT	MOLE %	GPM
Nitrogen	3.41	0.000
Methane	49.28	0.000
Carbon Dioxide	0.55	0.000
Ethane	20.87	5.572
H2S	0.00	0.000
Propane	15.70	4.305
i-Butane	1.61	0.525
n-Butane	5.10	1.601
i-Pentane	0.91	0.331
n-Pentane	1.20	0.432
Hexanes+	1.37	0.600
Oxygen/Argon	0.00	0.000
Total	100.00	13.366

CALCULATED SPECIFIC GRAVITY 1.0046 (Air =1.0000)

CALCULATED GROSS BTU/ft³ 1617 (Saturated) 1645 (Dry) at 14.73 psi and 60°F

REMARKS

ASTRO-CHEM LAB, INC.

4102 2nd Ave. West
Williston, North Dakota 58802-0972
P.O. Box 972
Phone: (701) 572-7355

WATER ANALYSIS REPORT

SAMPLE NUMBER W-11-3710 DATE OF ANALYSIS 8-10-11

COMPANY G3 Operating

CITY Williston STATE ND

WELL NAME AND/OR NUMBER Muller 1-21-16H

DATE RECEIVED 7-25-11 DST NUMBER

SAMPLE SOURCE

LOCATION OF SEC. TWN. RANGE COUNTY Williams

FORMATION Bakken DEPTH

DISTRIBUTION Double EE Service
Attn: Luke Fell

RESISTIVITY @ 77°F = 0.048 Ohm-Meters pH = 5.58

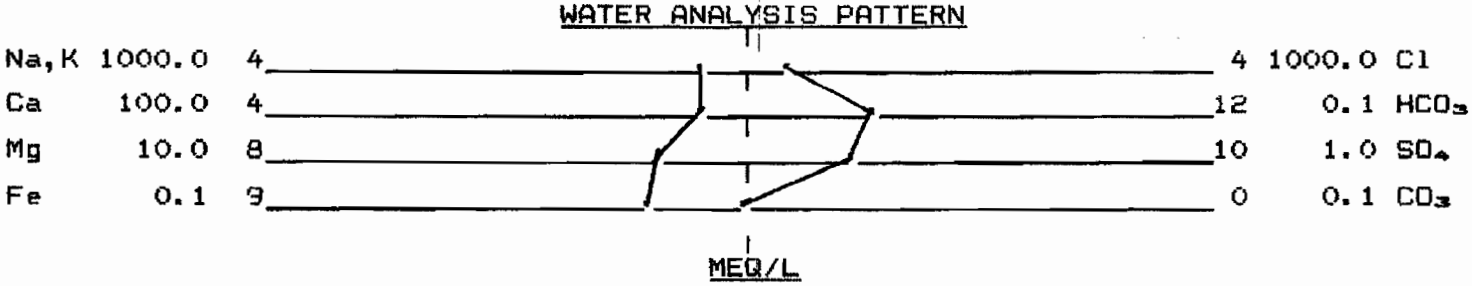
SPECIFIC GRAVITY @ 77°F = 1.155 H_2S = Negative

TOTAL DISSOLVED SOLIDS (CALCULATED) = 236173 mg/L (204479 ppm)

SODIUM CHLORIDE (CALCULATED) = 232349 mg/L (201168 ppm)

CATION	MEQ/L	mg/L	ANION	MEQ/L	mg/L
CALCIUM	440.0	8730	CHLORIDE	3974.4	140904
MAGNESIUM	80.0	889	CARBONATE	0.0	0
SODIUM	3527.7	81100	BICARBONATE	1.2	73
IRON	0.9	16.2	SULFATE	10.3	496
CHROMIUM	0.1	0.5	NITRATE	0.0	0
BARIUM	0.2	14.2			
POTASSIUM	101.0	3950			

WATER ANALYSIS PATTERN



REMARKS Sampled 7-25-11 by EE

ANALYZED BY: C. Jungels

WELL COMPLETION OR RECOMPLETION REPORT - FORM 6

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 2468 (04-2010)

AUG 2011 RECEIVED ND OIL & GAS DIVISION

Well File No. **20552**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

Designate Type of Completion
☑ Oil Well ☐ EOR Well ☐ Recompletion ☐ Deepened Well ☐ Added Horizontal Leg ☐ Extended Horizontal Leg
☐ Gas Well ☐ SWD Well ☐ Water Supply Well ☐ Other:

Well Name and Number: **Muller 1-21-16H**			Spacing Unit Description: **1280** Secs 16 & 21-158-103
Operator: **G3 Operating, LLC**		Telephone Number: **(303) 297-2028**	Field: ~~Wildcat~~ Climax
Address: **475 17th Street, Suite 1210**			Pool: **Middle Bakken**
City: **Denver**	State: **CO**	Zip Code: **80202**	Permit Type: ☑ Wildcat ☐ Development ☐ Extension

LOCATION OF WELL

At Surface	Qtr-Qtr	Section	Township	Range	County
300 F N L 1270 F E L	SESW	21	158 N	103 W	Williams

Spud Date	Date TD Reached	Drilling Contractor and Rig Number	KB Elevation (Ft)	Graded Elevation (Ft)
April 29, 2011	June 2, 2011	Ensign #71	2276	2260

Type of Electric and Other Logs Run (See Instructions)
Gamma Ray LWD

CASING & TUBULARS RECORD (Report all strings set in well)

Well Bore	String Type	String Size (Inch)	Top Set (MD Ft)	Depth Set (MD Ft)	Hole Size (Inch)	Weight (Lbs/Ft)	Anchor Set (MD Ft)	Packer Set (MD Ft)	Sacks Cement	Top of Cement
Surface Hole	Conductor	16								
Vertical Hole	Surface	9.625		2118	8 3/4	36			670	Surface
Directional	Intermediate	7.00	0	7410	8 3/4	29			110	3200
Directional	Intermediate	7.00	7410	8543	8 3/4	32			210	
Directional	Intermediate	7.00	8543	9982	8 3/4	29			380	
Lateral1	Production	4.50	9982	19333	6	13.5				

PERFORATION & OPEN HOLE INTERVALS

Well Bore	Well Bore TD Drillers Depth (MD Ft)	Completion Type	Open Hole/Perforated Interval (MD,Ft) Top	Bottom	Kick-off Point (MD Ft)	Top of Casing Window (MD Ft)	Date Perf'd or Drilled	Date Isolated	Isolation Method	Sacks Cement
Lateral1		Open Hole	10046	14988	9050		06/30/2011			
Sidetrack1	19333	Open Hole	12160	19333						

PRODUCTION

Current Producing Open Hole or Perforated Interval(s), This Completion, Top and Bottom, (MD Ft)	Name of Zone (If Different from Pool Name)
Lateral 1: 10,070 - 19,333	Middle Bakken

Date Well Completed (SEE INSTRUCTIONS)	Producing Method	Pumping-Size & Type of Pump	Well Status (Producing or Shut-In)
July 17, 2011	Flowing	NA	Producing

Date of Test	Hours Tested	Choke Size	Production for Test	Oil (Bbls)	Gas (MCF)	Water (Bbls)	Oil Gravity-API (Corr.)	Disposition of Gas
07/17/2011	24	40 /64		682	260	3730	39.2 °	Flared

Flowing Tubing Pressure (PSI)	Flowing Casing Pressure (PSI)	Calculated 24-Hour Rate	Oil (Bbls)	Gas (MCF)	Water (Bbls)	Gas-Oil Ratio
	400		682	260	3730	381

orig.

GEOLOGICAL MARKERS

Formation	MD (Ft)	TVD (Ft)
Pierre/Base Foxhills	**1575**	**1575**
Greenhorn	**4275**	**4275**
Dakota (Marine)	**4995**	**4995**
Rierdon	**5975**	**5975**
Spearfish	**6580**	**6580**
Minnelusa	**6755**	**6755**
Otter	**7200**	**7200**
Kibbey Lime	**7476**	**7476**
Charles Salt	**7620**	**7620**
Base last Charles Salt	**8205**	**8205**
Mission Canyon	**8390**	**8390**
Lodgepole	**9080**	**9080**
Upper Bakken Shale	**9615**	**9797**
Top of Bakken	**9625**	**9836**
Target	**9640**	**9967**

PLUG BACK INFORMATION

Well Bore	Type of Plug	Top (Ft)	Bottom (Ft)	Sacks Cement
Vertical Hole	**Cement Plug**	**9000**	**9750**	**400**
Vertical Hole	**Cement Plug**	**8702**	**9132**	**200**

CORES CUT

Top (Ft)	Bottom (Ft)	Formation	Top (Ft)	Bottom (Ft)	Formation
9580	**9730**	**Bakken Shale**			

Drill Stem Test

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								

Well Specific Stimulations

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
06/30/2011	Bakken	10070	19333	38	81152	Barrels

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)
Other		4059716	6967	35.0

Details
Pumped 1,549,963 lbs of 40/70 proppant, 1,225,142 lbs of 20/40 Sinterlite proppant, and 1,284,611 MidProp proppant. AIR= 32 BPM, ATP= 5,085 PSI

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

ADDITIONAL INFORMATION AND/OR LIST OF ATTACHMENTS

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.	Email Address	Date
	lherbison@g3operating.com	08/08/2011
Signature	Printed Name	Title
Lacy Herbison	Lacy Herbison	Operation Tech

DIRECTIONAL SURVEY REPORT

G3 Operating

MULLER 1-21-16H ST2

WILLIAMS CO., ND

PREPARED BY: Kristopher Bertsch

June 29, 2011

G3 Operating, LLC
475 Seventeenth Street, Ste 1210
Denver, CO 80202

Attn: Aldo Gurmendi

RE: G3 Operating
Muller 1-21-16H ST2
Williams Co., ND
RIG: Ensign 71
FILENAME: 700002316-WY-WY

Dear Sir:

We hereby certify that the enclosed Original Field Survey Data contained in this report represents to the best of our knowledge, a true and accurate survey of the well at the time the survey was ran.

SURVEY DATA

1 - Original survey report and plot
2 - Survey report copies and plots

We appreciate the opportunity to work with you and we look forward to your business support. If you have any questions, I can be reached at (307) 265-3145.

Sincerely,

Kristopher Bertsch
MWD Coordinator
PathFinder Energy Services

DIRECTIONAL SURVEY COMPANY REPORT:

1. **NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES**

2. **NAME OF PERSON(S) PERFORMING SURVEY:**

   A. Mike Hansen **B. Gary Smith**

3. **POSITION OF SAID PERSON(S): (A & B) SURVEYOR (FIELD ENGINEER).**

4. **DATE(S) ON WHICH SURVEY WAS PERFORMED: 5/26/2011 TO 6/1/2011**

5. **STATE IN WHICH SURVEY WAS PERFORMED: ONSHORE, NORTH DAKOTA**

6. **LOCATION OF WELL: WILLIAMS COUNTY**

7. **TYPE OF SURVEY(S) PERFORMED: MWD**

8. **COMPLETE IDENTIFICATION OF WELL:**

   G3 Operating

   Muller 1-21-16H ST2

   Williams Co., ND

   RIG: Ensign 71

9. **SURVEY CERTIFIED FROM: 12148 TO 19288 FEET MEASURED DEPTH.**

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 10006 FEET ON A BEARING OF 0.23 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT PROJECTED MEASURED DEPTH OF 19333 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

Kristopher Bertsch
MWD COORDINATOR

Tie-in Date: 05/26/2011
Date Completed: 06/01/2011

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST2
WILLIAMS COUNTY, ND
Rig:Ensign 71
PathFinder Office Supervisor: Rich Arnold
PathFinder Field Engineers: Mike Hansen
Gary Smith

Survey Calculations by PathCalc v2.01 using Minimum Curvature

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:48.29.23.3808 N LON:104.0.36.5004 W
GRID Reference:NAD83 north dakota north Lambert
Ref GRID Coor: X: 1117595.8640 Y: 562849.1288
North Aligned To:TRUE NORTH
Total Magnetic Correction: 9.07° EAST TO TRUE
Vertical Section Plane: 0.26
Survey Vert. Reference: 16.00' Rotary Table To Ground
Altitude:2260.00' Ground To MSL

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
** TIE INTO PATHFINDER MWD SURVEY OF ST1.										
12078.00	90.66	1.42	9612.64	94.00	2756.38	2756.38 N	6.48 E	2756.39@	0.13	0.13
ST2 DEPARTS ORIGINAL WELLBORE AT 12160'MD (9613'TVD). THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
12148.00	89.60	0.81	9612.48	70.00	2826.37	2826.37 N	7.84 E	2826.38@	0.16	1.75
12183.00	88.46	3.44	9613.07	35.00	2861.35	2861.33 N	9.14 E	2861.35@	0.18	8.19
12277.00	90.75	6.96	9613.72	94.00	2954.97	2954.92 N	17.66 E	2954.98@	0.34	4.47
12372.00	91.36	6.79	9611.97	95.00	3049.32	3049.22 N	29.03 E	3049.36@	0.55	0.67
12466.00	91.19	4.50	9609.88	94.00	3142.88	3142.74 N	38.27 E	3142.97@	0.70	2.44
12560.00	91.54	2.74	9607.64	94.00	3236.69	3236.52 N	44.20 E	3236.82@	0.78	1.91
12655.00	90.75	0.98	9605.74	95.00	3331.63	3331.45 N	47.29 E	3331.78@	0.81	2.03
12750.00	91.10	359.49	9604.21	95.00	3426.61	3426.43 N	47.68 E	3426.76@	0.80	1.61
12844.00	91.63	359.93	9601.97	94.00	3520.58	3520.40 N	47.20 E	3520.72@	0.77	0.73
12939.00	91.28	359.93	9599.56	95.00	3615.55	3615.37 N	47.08 E	3615.68@	0.75	0.37
13034.00	90.66	359.14	9597.95	95.00	3710.53	3710.35 N	46.31 E	3710.64@	0.72	1.06
13129.00	91.63	359.31	9596.05	95.00	3805.49	3805.32 N	45.03 E	3805.59@	0.68	1.04
13223.00	91.89	359.23	9593.16	94.00	3899.43	3899.27 N	43.83 E	3899.52@	0.64	0.29
13317.00	90.75	358.61	9591.00	94.00	3993.38	3993.23 N	42.06 E	3993.45@	0.60	1.38
13412.00	90.84	359.40	9589.68	95.00	4088.35	4088.20 N	40.41 E	4088.40@	0.57	0.84
13506.00	90.84	0.02	9588.30	94.00	4182.33	4182.19 N	39.93 E	4182.38@	0.55	0.66
13600.00	91.19	359.75	9586.64	94.00	4276.31	4276.18 N	39.75 E	4276.36@	0.53	0.47
13695.00	90.57	359.67	9585.18	95.00	4371.30	4371.16 N	39.27 E	4371.34@	0.51	0.66
13789.00	90.75	359.23	9584.10	94.00	4465.28	4465.15 N	38.36 E	4465.32@	0.49	0.51
13884.00	90.92	359.05	9582.71	95.00	4560.25	4560.13 N	36.94 E	4560.28@	0.46	0.26
13979.00	90.84	359.84	9581.25	95.00	4655.23	4655.12 N	36.02 E	4655.26@	0.44	0.84
14074.00	90.04	359.49	9580.52	95.00	4750.22	4750.11 N	35.46 E	4750.24@	0.43	0.92
14168.00	90.84	358.96	9579.80	94.00	4844.20	4844.10 N	34.19 E	4844.22@	0.40	1.02
14262.00	91.19	358.17	9578.14	94.00	4938.15	4938.05 N	31.84 E	4938.16@	0.37	0.92

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST2
WILLIAMS COUNTY, ND
RIG:Ensign 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
14356.00	90.48	357.91	9576.77	94.00	5032.07	5031.99 N	28.62 E	5032.07@	0.33	0.80
14450.00	89.96	358.08	9576.41	94.00	5125.99	5125.93 N	25.33 E	5125.99@	0.28	0.58
14545.00	90.66	358.79	9575.89	95.00	5220.94	5220.89 N	22.74 E	5220.94@	0.25	1.05
14639.00	90.66	358.26	9574.81	94.00	5314.89	5314.85 N	20.32 E	5314.89@	0.22	0.56
14733.00	91.01	359.58	9573.44	94.00	5408.85	5408.82 N	18.55 E	5408.86@	0.20	1.45
14827.00	90.48	359.75	9572.22	94.00	5502.84	5502.81 N	18.00 E	5502.84@	0.19	0.59
14921.00	90.13	359.58	9571.72	94.00	5596.83	5596.81 N	17.45 E	5596.84@	0.18	0.41
15016.00	90.57	359.49	9571.14	95.00	5691.82	5691.81 N	16.68 E	5691.83@	0.17	0.47
15110.00	90.92	359.14	9569.91	94.00	5785.80	5785.79 N	15.55 E	5785.81@	0.15	0.53
15204.00	90.75	359.58	9568.54	94.00	5879.78	5879.78 N	14.50 E	5879.79@	0.14	0.50
15299.00	89.52	358.52	9568.32	95.00	5974.76	5974.76 N	12.93 E	5974.77@	0.12	1.71
15393.00	90.22	0.10	9568.53	94.00	6068.74	6068.75 N	11.80 E	6068.76@	0.11	1.84
15488.00	89.52	359.49	9568.75	95.00	6163.73	6163.75 N	11.46 E	6163.76@	0.11	0.98
15583.00	91.19	359.31	9568.16	95.00	6258.72	6258.74 N	10.46 E	6258.74@	0.10	1.77
15677.00	91.45	359.40	9565.99	94.00	6352.68	6352.71 N	9.40 E	6352.71@	0.08	0.29
15772.00	91.19	358.26	9563.81	95.00	6447.63	6447.66 N	7.47 E	6447.66@	0.07	1.23
15867.00	90.22	357.64	9562.64	95.00	6542.54	6542.59 N	4.07 E	6542.59@	0.04	1.21
15962.00	90.31	358.52	9562.20	95.00	6637.47	6637.53 N	0.88 E	6637.53@	0.01	0.93
16056.00	90.48	358.17	9561.55	94.00	6731.41	6731.49 N	1.83 W	6731.49@	359.98	0.41
16150.00	90.75	358.61	9560.54	94.00	6825.36	6825.45 N	4.47 W	6825.45@	359.96	0.55
16245.00	90.75	358.43	9559.30	95.00	6920.31	6920.41 N	6.92 W	6920.41@	359.94	0.19
16339.00	91.10	358.35	9557.78	94.00	7014.24	7014.36 N	9.57 W	7014.37@	359.92	0.38
16434.00	91.36	358.35	9555.74	95.00	7109.17	7109.30 N	12.30 W	7109.31@	359.90	0.27
16528.00	91.54	358.47	9553.36	94.00	7203.09	7203.23 N	14.91 W	7203.25@	359.88	0.23
16623.00	92.07	0.46	9550.37	95.00	7298.03	7298.18 N	15.79 W	7298.19@	359.88	2.17
16717.00	89.43	0.90	9549.14	94.00	7392.01	7392.15 N	14.68 W	7392.17@	359.89	2.85
16811.00	89.43	1.25	9550.07	94.00	7486.00	7486.13 N	12.92 W	7486.14@	359.90	0.37
16906.00	89.52	0.90	9550.94	95.00	7580.98	7581.11 N	11.13 W	7581.12@	359.92	0.38
17000.00	89.96	2.22	9551.37	94.00	7674.95	7675.07 N	8.57 W	7675.08@	359.94	1.48

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST2
WILLIAMS COUNTY, ND
RIG:Ensign 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
17095.00	90.40	3.88	9551.07	95.00	7769.84	7769.93 N	3.52 W	7769.93@	359.97	1.81
17190.00	90.48	3.53	9550.34	95.00	7864.66	7864.73 N	2.62 E	7864.73@	0.02	0.38
17284.00	91.01	2.48	9549.12	94.00	7958.55	7958.59 N	7.55 E	7958.60@	0.05	1.25
17379.00	91.36	2.22	9547.16	95.00	8053.46	8053.49 N	11.44 E	8053.50@	0.08	0.46
17473.00	91.80	2.22	9544.56	94.00	8147.37	8147.39 N	15.08 E	8147.40@	0.11	0.47
17568.00	91.10	2.04	9542.16	95.00	8242.29	8242.29 N	18.61 E	8242.31@	0.13	0.76
17662.00	90.92	0.90	9540.50	94.00	8336.25	8336.24 N	21.02 E	8336.27@	0.14	1.23
17757.00	90.22	1.34	9539.56	95.00	8431.24	8431.22 N	22.88 E	8431.25@	0.16	0.87
17852.00	90.31	0.63	9539.12	95.00	8526.23	8526.20 N	24.51 E	8526.24@	0.16	0.75
17947.00	90.31	1.16	9538.60	95.00	8621.22	8621.19 N	26.00 E	8621.23@	0.17	0.56
18042.00	90.48	1.34	9537.95	95.00	8716.20	8716.17 N	28.07 E	8716.21@	0.18	0.26
18137.00	90.22	0.55	9537.37	95.00	8811.19	8811.15 N	29.63 E	8811.20@	0.19	0.88
18231.00	90.92	0.63	9536.43	94.00	8905.19	8905.14 N	30.60 E	8905.19@	0.20	0.75
18326.00	91.36	0.55	9534.54	95.00	9000.17	9000.11 N	31.58 E	9000.17@	0.20	0.47
18421.00	91.01	0.28	9532.58	95.00	9095.14	9095.09 N	32.27 E	9095.15@	0.20	0.47
18515.00	90.40	359.67	9531.42	94.00	9189.14	9189.08 N	32.23 E	9189.14@	0.20	0.92
18610.00	90.31	1.16	9530.83	95.00	9284.13	9284.08 N	32.92 E	9284.14@	0.20	1.57
18704.00	91.10	1.60	9529.68	94.00	9378.10	9378.04 N	35.18 E	9378.11@	0.21	0.96
18799.00	91.28	1.25	9527.70	95.00	9473.06	9472.99 N	37.54 E	9473.07@	0.23	0.41
18893.00	91.10	0.46	9525.75	94.00	9567.04	9566.96 N	38.94 E	9567.04@	0.23	0.86
18987.00	91.63	359.84	9523.51	94.00	9661.01	9660.93 N	39.19 E	9661.01@	0.23	0.87
19082.00	91.71	0.10	9520.74	95.00	9755.97	9755.89 N	39.14 E	9755.97@	0.23	0.29
19176.00	91.45	0.19	9518.15	94.00	9849.93	9849.86 N	39.38 E	9849.93@	0.23	0.29
19271.00	90.84	0.19	9516.25	95.00	9944.91	9944.84 N	39.69 E	9944.92@	0.23	0.64
19288.00	90.66	359.67	9516.03	17.00	9961.91	9961.83 N	39.67 E	9961.91@	0.23	3.24
STRAIGHT LINE PROJECTION TO BIT.										
19333.00	90.66	359.67	9515.51	45.00	10006.91	10006.83 N	39.41 E	10006.91@	0.23	0.01

PathFinder Energy Services, Inc.
Survey Report

** The survey data at tie-in point was furnished by a recognized survey company and entered as submitted. Survey stations above the tie-in point represent recalculated data by PathFinder Energy Services, Inc. and may reflect minor changes due to rounding differences between survey programs. Only survey stations taken by qualified PathFinder personnel are subject to certification.

Company: G3 Operating, LLC
Field: Williams Co., ND
Location: Sec.21-T158N-R103W
Well: Muller 1-21-16H
Wellbore #1
Survey: ST2 (Muller 1-21-16H/Wellbore #1)

PATHFINDER
A Schlumberger Company

WELL DETAILS: Muller 1-21-16H

Ground Level: 2260.0

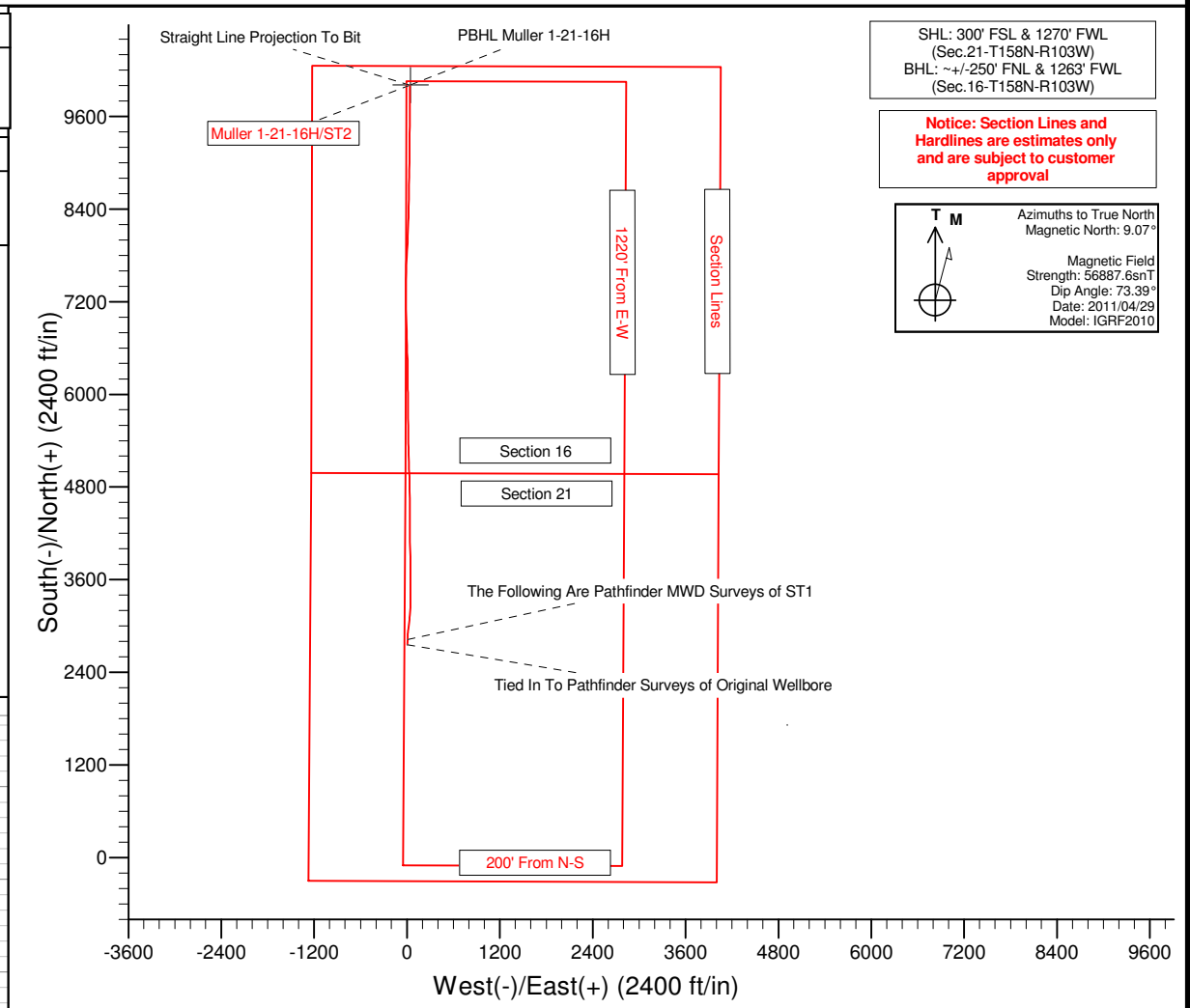
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	562849.05	1117595.89	48° 29' 23.380 N	104° 0' 36.500 W	

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
PBHL Muller 1-21-16H	9557.7	10007.2	46.1	Point

ANNOTATIONS

TVD	MD	Annotation
9612.6	12078.0	Tied In To Pathfinder Surveys of Original Wellbore
9612.5	12148.0	The Following Are Pathfinder MWD Surveys of ST1
9515.5	19333.0	Straight Line Projection To Bit

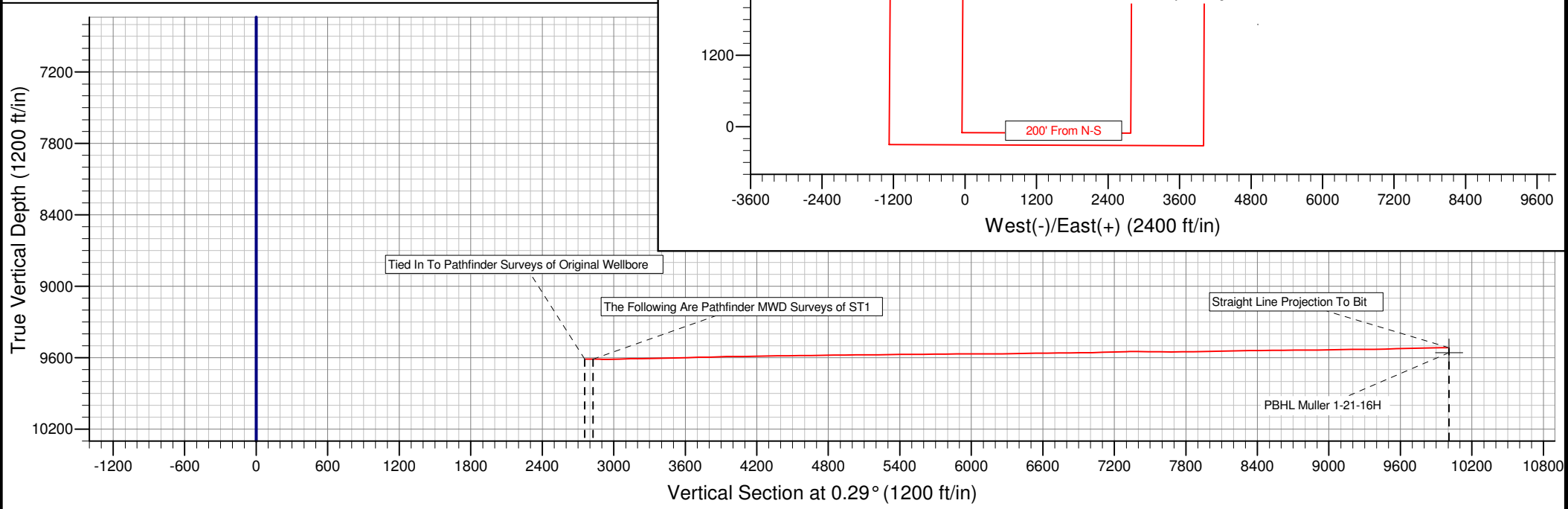


SHL: 300' FSL & 1270' FWL
(Sec.21-T158N-R103W)
BHL: ~+/-250' FNL & 1263' FWL
(Sec.16-T158N-R103W)

Notice: Section Lines and Hardlines are estimates only and are subject to customer approval

Azimuths to True North
Magnetic North: 9.07°

Magnetic Field
Strength: 56887.6snT
Dip Angle: 73.39°
Date: 2011/04/29
Model: IGRF2010



PathFinder Energy Services, Inc.
BHL Report

Tie-in Date: 05/26/2011
Date Completed: 06/01/2011

G3 OPERATING, LLC
MULLER 1-21-16H ST2
WILLIAMS COUNTY, ND
Rig:Ensign 71
PathFinder Office Supervisor: Rich Arnold
PathFinder Field Engineers:Mike Hansen
Gary Smith

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:48.29.23.3808 N LON:104.0.36.5004 W
GRID Reference:NAD83 north dakota north Lambert
Ref GRID Coor: X: 1117595.8640 Y: 562849.1288
North Aligned To:TRUE NORTH
Total Magnetic Correction: 9.07° EAST TO TRUE
Vertical Section Plane: 0.26
Survey Vert. Reference: 16.00' Rotary Table To Ground
Altitude:2260.00' Ground To MSL

Measured Depth	19333.00	(feet)
Inclination	90.66	(deg)
Azimuth	359.67	(deg)
True Vertical Depth	9515.51	(feet)
Vertical Section	10006.91	(feet)
Survey X cord	1117635.28	(feet)
Survey Y cord	572855.96	(feet)
Survey Lat	48.51723426 N	(deg)
Survey Lon	104.01185814 W	(deg)
Rectangular Corr. N/S	10006.83 N	(feet)
Rectangular Corr. E/W	39.41 E	(feet)
Closure Distance	10006.91	(feet)
Direction of Closure	0.23	(deg)
Dogleg Severity	0.01	(deg/100ft)

DIRECTIONAL SURVEY REPORT

G3 Operating

MULLER 1-21-16H ST1

WILLIAMS CO., ND

PREPARED BY: Kristopher Bertsch

June 29, 2011

G3 Operating, LLC
475 Seventeenth Street, Ste 1210
Denver, CO 80202

Attn: Aldo Gurmendi

RE: G3 Operating
Muller 1-21-16H ST1
Williams Co., ND
RIG: Ensign 71
FILENAME: 700002316-WY-WY

Dear Sir:

We hereby certify that the enclosed Original Field Survey Data contained in this report represents to the best of our knowledge, a true and accurate survey of the well at the time the survey was ran.

SURVEY DATA

1 - Original survey report and plot
2 - Survey report copies and plots

We appreciate the opportunity to work with you and we look forward to your business support. If you have any questions, I can be reached at (307) 265-3145.

Sincerely,

Kristopher Bertsch
MWD Coordinator
PathFinder Energy Services

DIRECTIONAL SURVEY COMPANY REPORT:

1. **NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES**

2. **NAME OF PERSON(S) PERFORMING SURVEY:**

   A. Mike Hansen **B. Gary Smith**

3. **POSITION OF SAID PERSON(S): (A & B) SURVEYOR (FIELD ENGINEER).**

4. **DATE(S) ON WHICH SURVEY WAS PERFORMED: 5/15/2011 TO 5/24/2011**

5. **STATE IN WHICH SURVEY WAS PERFORMED: ONSHORE, NORTH DAKOTA**

6. **LOCATION OF WELL: WILLIAMS COUNTY**

7. **TYPE OF SURVEY(S) PERFORMED: MWD**

8. **COMPLETE IDENTIFICATION OF WELL:**

   G3 Operating

   Muller 1-21-16H ST1

   Williams Co., ND

   RIG: Ensign 71

9. **SURVEY CERTIFIED FROM: 9050 TO 14911 FEET MEASURED DEPTH.**

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 5666 FEET ON A BEARING OF 0.29 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT PROJECTED MEASURED DEPTH OF 14988 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

Kristopher Bertsch
MWD COORDINATOR

Tie-in Date: 05/15/2011
Date Completed: 05/24/2011

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
Rig:ENSIGN 71
PathFinder Office Supervisor: RICH ARNOLD
PathFinder Field Engineers: M. HANSEN
G. SMITH

Survey Calculations by PathCalc v2.01 using Minimum Curvature

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:48.29.23.3808 N LON:104.0.36.5004 W
GRID Reference:NAD83 north dakota north Lambert
Ref GRID Coor: X: 1117595.8640 Y: 562849.1288
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Vertical Section Plane: 0.26
Survey Vert. Reference: 16.00' Rotary Table To Ground
Altitude:2260.00' Ground To MSL

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
TIE INTO PATHFINDER SURVEY OF ORIGINAL WELLBORE.										
8954.00	3.34	143.63	8952.38	93.00	56.97	56.89 N	18.13 E	59.71@	17.68	1.83
THE FOLLOWING ARE PATHFINDER MWD SURVEYS OF ST1.										
9050.00	1.76	128.69	9048.28	96.00	53.81	53.71 N	20.94 E	57.65@	21.30	1.77
9081.00	2.73	8.28	9079.27	31.00	54.24	54.15 N	21.42 E	58.23@	21.58	12.66
9112.00	7.21	350.61	9110.15	31.00	56.89	56.80 N	21.20 E	60.63@	20.47	15.10
9143.00	11.08	345.78	9140.75	31.00	61.70	61.61 N	20.16 E	64.82@	18.12	12.72
9174.00	14.42	347.18	9170.98	31.00	68.34	68.26 N	18.57 E	70.74@	15.22	10.82
9205.00	17.76	347.54	9200.76	31.00	76.72	76.64 N	16.69 E	78.44@	12.28	10.78
9236.00	20.31	350.17	9230.06	31.00	86.63	86.56 N	14.75 E	87.81@	9.67	8.68
9268.00	20.40	350.26	9260.07	32.00	97.59	97.53 N	12.86 E	98.37@	7.51	0.30
9299.00	23.74	352.11	9288.79	31.00	109.09	109.04 N	11.09 E	109.60@	5.81	11.00
9330.00	26.73	352.55	9316.83	31.00	122.18	122.14 N	9.33 E	122.49@	4.37	9.66
9361.00	29.55	353.16	9344.16	31.00	136.67	136.64 N	7.51 E	136.85@	3.15	9.14
9392.00	32.98	354.30	9370.66	31.00	152.66	152.63 N	5.76 E	152.74@	2.16	11.23
9423.00	37.20	354.66	9396.02	31.00	170.38	170.37 N	4.05 E	170.42@	1.36	13.63
9454.00	42.82	354.39	9419.75	31.00	190.21	190.20 N	2.15 E	190.21@	0.65	18.14
9485.00	46.17	355.01	9441.86	31.00	211.83	211.83 N	0.15 E	211.83@	0.04	10.90
9516.00	46.60	354.39	9463.25	31.00	234.17	234.18 N	1.93 W	234.18@	359.53	2.01
9548.00	49.86	357.38	9484.56	32.00	257.95	257.97 N	3.62 W	258.00@	359.20	12.34
9578.00	53.64	359.58	9503.13	30.00	281.50	281.52 N	4.24 W	281.55@	359.14	13.85
9610.00	57.60	0.63	9521.20	32.00	307.90	307.92 N	4.18 W	307.95@	359.22	12.67
9641.00	61.73	2.92	9536.85	31.00	334.64	334.66 N	3.34 W	334.67@	359.43	14.77
9672.00	64.90	2.92	9550.77	31.00	362.30	362.32 N	1.93 W	362.32@	359.69	10.23
9702.00	67.18	2.30	9562.96	30.00	389.69	389.70 N	0.69 W	389.70@	359.90	7.83
9732.00	68.41	1.51	9574.29	30.00	417.46	417.46 N	0.24 E	417.46@	0.03	4.77
9763.00	69.73	0.98	9585.37	31.00	446.41	446.41 N	0.87 E	446.41@	0.11	4.55

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
RIG:ENSIGN 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
9794.00	72.81	1.16	9595.32	31.00	475.76	475.76 N	1.41 E	475.76@	0.17	9.95
9826.00	75.18	0.98	9604.14	32.00	506.51	506.51 N	1.99 E	506.51@	0.22	7.43
9857.00	78.61	1.42	9611.17	31.00	536.70	536.69 N	2.62 E	536.70@	0.28	11.15
9888.00	82.31	1.95	9616.31	31.00	567.25	567.24 N	3.52 E	567.25@	0.36	12.05
9918.00	85.82	1.42	9619.41	30.00	597.08	597.06 N	4.40 E	597.08@	0.42	11.83
9949.00	88.90	0.28	9620.84	31.00	628.04	628.02 N	4.86 E	628.04@	0.44	10.59
10006.00	91.80	357.38	9620.49	57.00	685.01	685.00 N	3.69 E	685.01@	0.31	7.19
10100.00	89.34	356.24	9619.55	94.00	778.82	778.84 N	1.54 W	778.84@	359.89	2.88
10195.00	88.99	358.26	9620.94	95.00	873.68	873.71 N	6.09 W	873.74@	359.60	2.16
10290.00	89.25	359.40	9622.40	95.00	968.64	968.68 N	8.03 W	968.71@	359.52	1.23
10384.00	88.55	0.10	9624.20	94.00	1062.61	1062.66 N	8.44 W	1062.70@	359.54	1.05
10478.00	89.78	359.93	9625.57	94.00	1156.60	1156.65 N	8.42 W	1156.68@	359.58	1.32
10572.00	90.48	0.72	9625.36	94.00	1250.60	1250.65 N	7.89 W	1250.67@	359.64	1.12
10666.00	89.96	0.46	9625.00	94.00	1344.60	1344.64 N	6.92 W	1344.66@	359.71	0.62
10760.00	90.92	0.28	9624.28	94.00	1438.59	1438.63 N	6.31 W	1438.65@	359.75	1.04
10853.00	91.01	359.84	9622.71	93.00	1531.58	1531.62 N	6.21 W	1531.63@	359.77	0.48
10947.00	90.75	359.93	9621.27	94.00	1625.56	1625.61 N	6.40 W	1625.62@	359.77	0.29
11041.00	90.57	359.40	9620.18	94.00	1719.55	1719.60 N	6.95 W	1719.62@	359.77	0.60
11134.00	90.31	359.31	9619.47	93.00	1812.54	1812.59 N	8.00 W	1812.61@	359.75	0.30
11228.00	89.96	359.40	9619.25	94.00	1906.53	1906.59 N	9.06 W	1906.61@	359.73	0.38
11322.00	90.40	1.16	9618.95	94.00	2000.52	2000.58 N	8.60 W	2000.60@	359.75	1.93
11416.00	89.96	0.46	9618.66	94.00	2094.52	2094.57 N	7.27 W	2094.58@	359.80	0.88
11511.00	90.57	1.77	9618.22	95.00	2189.50	2189.55 N	5.42 W	2189.56@	359.86	1.52
11606.00	90.22	1.60	9617.56	95.00	2284.47	2284.51 N	2.63 W	2284.51@	359.93	0.41
11701.00	90.92	0.98	9616.62	95.00	2379.45	2379.48 N	0.49 W	2379.48@	359.99	0.98
11795.00	90.31	0.28	9615.61	94.00	2473.44	2473.46 N	0.54 E	2473.46@	0.01	0.99
11890.00	90.75	1.42	9614.73	95.00	2568.43	2568.45 N	1.95 E	2568.45@	0.04	1.29
11984.00	90.57	1.34	9613.65	94.00	2662.41	2662.41 N	4.22 E	2662.42@	0.09	0.21
12078.00	90.66	1.42	9612.64	94.00	2756.38	2756.38 N	6.48 E	2756.39@	0.13	0.13

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
RIG:ENSIGN 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
12173.00	90.66	0.72	9611.54	95.00	2851.37	2851.36 N	8.25 E	2851.37@	0.17	0.74
12267.00	90.48	0.98	9610.61	94.00	2945.36	2945.34 N	9.65 E	2945.36@	0.19	0.34
12361.00	90.48	0.37	9609.82	94.00	3039.35	3039.33 N	10.76 E	3039.35@	0.20	0.65
12456.00	90.22	0.72	9609.24	95.00	3134.35	3134.33 N	11.66 E	3134.35@	0.21	0.46
12550.00	90.84	1.16	9608.37	94.00	3228.34	3228.31 N	13.20 E	3228.34@	0.23	0.81
12644.00	91.01	0.72	9606.85	94.00	3322.32	3322.28 N	14.74 E	3322.32@	0.25	0.50
12739.00	90.92	1.07	9605.25	95.00	3417.30	3417.26 N	16.23 E	3417.30@	0.27	0.38
12834.00	90.48	0.98	9604.09	95.00	3512.28	3512.24 N	17.93 E	3512.28@	0.29	0.47
12929.00	90.22	0.19	9603.51	95.00	3607.28	3607.23 N	18.90 E	3607.28@	0.30	0.88
13024.00	90.31	0.81	9603.07	95.00	3702.27	3702.22 N	19.73 E	3702.28@	0.31	0.66
13118.00	90.57	0.90	9602.35	94.00	3796.27	3796.21 N	21.13 E	3796.27@	0.32	0.29
13212.00	90.31	0.63	9601.63	94.00	3890.26	3890.20 N	22.38 E	3890.26@	0.33	0.40
13307.00	90.31	0.55	9601.12	95.00	3985.26	3985.19 N	23.36 E	3985.26@	0.34	0.08
13402.00	89.87	0.02	9600.97	95.00	4080.26	4080.19 N	23.83 E	4080.26@	0.33	0.73
13496.00	89.69	0.02	9601.33	94.00	4174.25	4174.19 N	23.87 E	4174.26@	0.33	0.19
13590.00	90.22	0.10	9601.40	94.00	4268.25	4268.19 N	23.97 E	4268.26@	0.32	0.57
13685.00	90.57	359.93	9600.75	95.00	4363.25	4363.19 N	23.99 E	4363.25@	0.32	0.41
13779.00	90.31	0.10	9600.02	94.00	4457.25	4457.18 N	24.02 E	4457.25@	0.31	0.33
13874.00	90.22	359.75	9599.58	95.00	4552.24	4552.18 N	23.89 E	4552.25@	0.30	0.38
13969.00	90.04	0.55	9599.37	95.00	4647.24	4647.18 N	24.14 E	4647.24@	0.30	0.86
14063.00	90.31	359.23	9599.08	94.00	4741.24	4741.18 N	23.96 E	4741.24@	0.29	1.43
14157.00	90.48	359.05	9598.43	94.00	4835.22	4835.17 N	22.55 E	4835.22@	0.27	0.26
14252.00	90.84	359.05	9597.34	95.00	4930.19	4930.15 N	20.97 E	4930.19@	0.24	0.38
14346.00	90.75	0.10	9596.04	94.00	5024.17	5024.13 N	20.28 E	5024.17@	0.23	1.12
14440.00	90.84	0.55	9594.73	94.00	5118.16	5118.12 N	20.81 E	5118.16@	0.23	0.49
14535.00	90.84	0.55	9593.34	95.00	5213.15	5213.11 N	21.72 E	5213.15@	0.24	0.00
14629.00	90.57	1.16	9592.18	94.00	5307.14	5307.09 N	23.12 E	5307.14@	0.25	0.71
14723.00	90.31	1.16	9591.46	94.00	5401.12	5401.07 N	25.03 E	5401.12@	0.27	0.28
14817.00	89.96	0.55	9591.24	94.00	5495.12	5495.06 N	26.43 E	5495.12@	0.28	0.75

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
RIG:ENSIGN 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
14911.00	89.52	0.72	9591.67	94.00	5589.12	5589.05 N	27.47 E	5589.12@	0.28	0.50
STRAIGHT LINE PROJECTION TO BIT.										
14988.00	89.52	0.72	9592.31	77.00	5666.11	5666.04 N	28.44 E	5666.11@	0.29	0.00

Company: G3 Operating, LLC
Field: Williams Co., ND
Location: Sec.21-T158N-R103W
Well: Muller 1-21-16H
Wellbore #1
Survey: ST1 (Muller 1-21-16H/Wellbore #1)

PATHFINDER
A Schlumberger Company

WELL DETAILS: Muller 1-21-16H

Ground Level: 2260.0

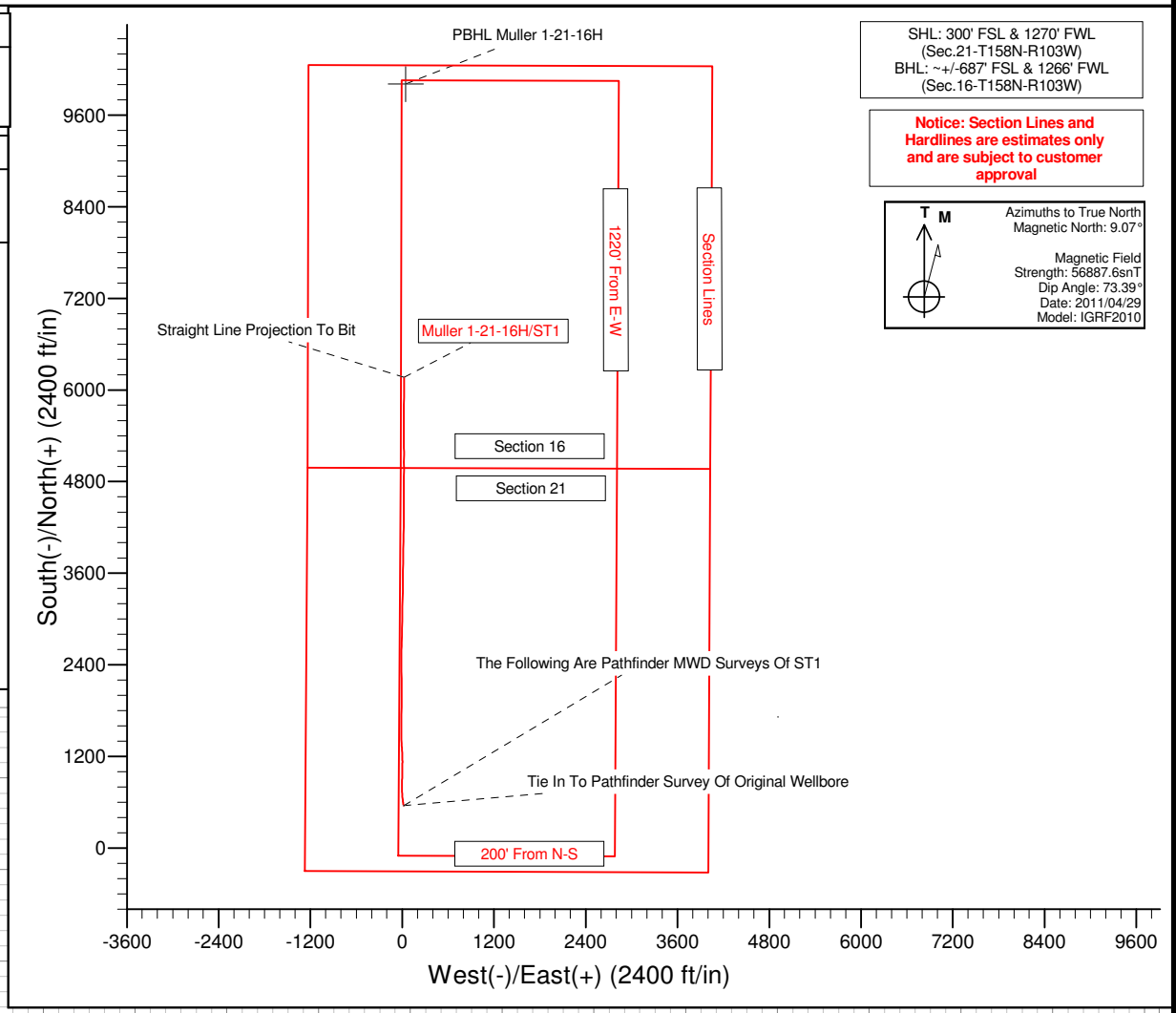
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	562849.05	1117595.89	48° 29' 23.380 N	104° 0' 36.500 W	

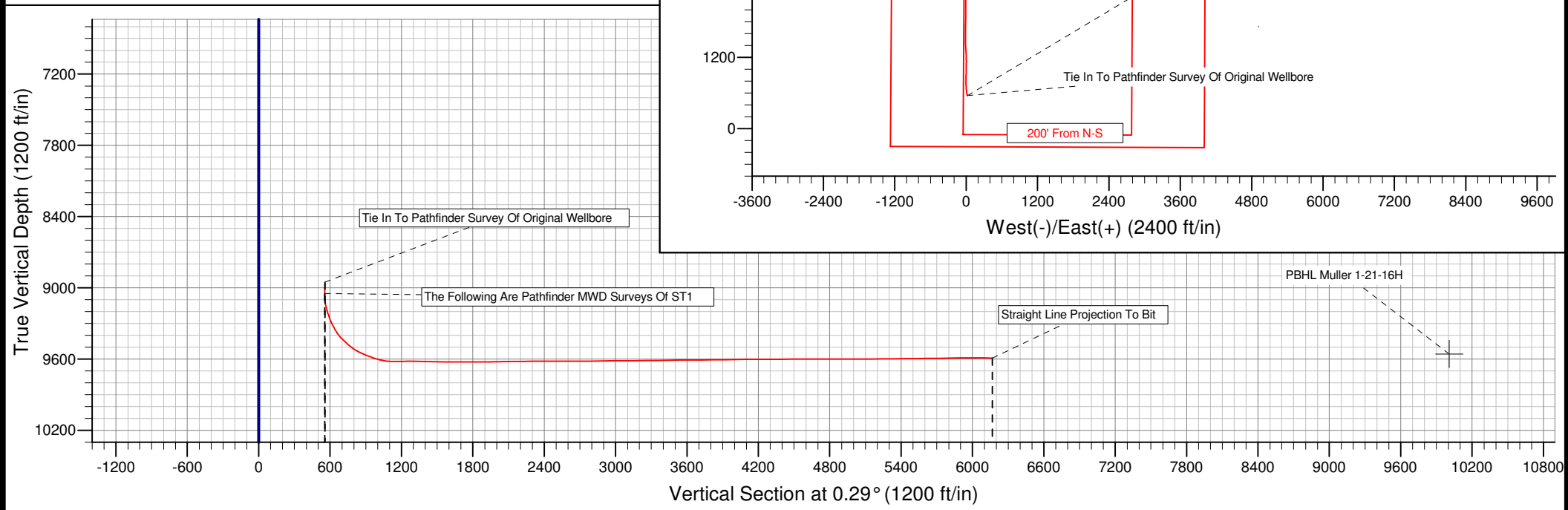
WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
PBHL Muller 1-21-16H	9557.7	10007.2	46.1	Point

ANNOTATIONS

TVD	MD	Annotation
8952.4	8954.0	Tie In To Pathfinder Survey Of Original Wellbore
9048.3	9050.0	The Following Are Pathfinder MWD Surveys Of ST1
9592.3	14988.0	Straight Line Projection To Bit





PathFinder Energy Services, Inc.
BHL Report

Tie-in Date: 05/15/2011
Date Completed: 05/24/2011

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
Rig:ENSIGN 71
PathFinder Office Supervisor: RICH ARNOLD
PathFinder Field Engineers:M. HANSEN
G. SMITH

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:48.29.23.3808 N LON:104.0.36.5004 W
GRID Reference:NAD83 north dakota north Lambert
Ref GRID Coor: X: 1117595.8640 Y: 562849.1288
North Aligned To:TRUE NORTH
Total Magnetic Correction: 9.07° EAST TO TRUE
Vertical Section Plane: 0.26
Survey Vert. Reference: 16.00' Rotary Table To Ground
Altitude:2260.00' Ground To MSL

Measured Depth	14988.00	(feet)
Inclination	89.52	(deg)
Azimuth	0.72	(deg)
True Vertical Depth	9592.31	(feet)
Vertical Section	5666.11	(feet)
Survey X cord	1117624.30	(feet)
Survey Y cord	568515.17	(feet)
Survey Lat	48.50534669 N	(deg)
Survey Lon	104.01108695 W	(deg)
Rectangular Corr. N/S	5666.04 N	(feet)
Rectangular Corr. E/W	28.44 E	(feet)
Closure Distance	5666.11	(feet)
Direction of Closure	0.29	(deg)
Dogleg Severity	0.00	(deg/100ft)

DIRECTIONAL SURVEY REPORT

G3 Operating

MULLER 1-21-16H

WILLIAMS CO., ND

PREPARED BY: Kristopher Bertsch

June 29, 2011

G3 Operating, LLC
475 Seventeenth Street, Ste 1210
Denver, CO 80202

Attn: Aldo Gurmendi

RE: G3 Operating
Muller 1-21-16H
Williams Co., ND
RIG: Ensign 71
FILENAME: 700002316-WY-WY

Dear Sir:

We hereby certify that the enclosed Original Field Survey Data contained in this report represents to the best of our knowledge, a true and accurate survey of the well at the time the survey was ran.

SURVEY DATA

1 - Original survey report and plot
2 - Survey report copies and plots

We appreciate the opportunity to work with you and we look forward to your business support. If you have any questions, I can be reached at (307) 265-3145.

Sincerely,

Kristopher Bertsch
MWD Coordinator
PathFinder Energy Services

DIRECTIONAL SURVEY COMPANY REPORT:

1. **NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES**

2. **NAME OF PERSON(S) PERFORMING SURVEY:**

   A. Mike Hansen **B. Gary Smith**

3. **POSITION OF SAID PERSON(S): (A & B) SURVEYOR (FIELD ENGINEER).**

4. **DATE(S) ON WHICH SURVEY WAS PERFORMED: 5/3/2011 TO 5/12/2011**

5. **STATE IN WHICH SURVEY WAS PERFORMED: ONSHORE, NORTH DAKOTA**

6. **LOCATION OF WELL: WILLIAMS COUNTY**

7. **TYPE OF SURVEY(S) PERFORMED: MWD**

8. **COMPLETE IDENTIFICATION OF WELL:**

   G3 Operating

   Muller 1-21-16H

   Williams Co., MT

   RIG: Ensign 71

9. **SURVEY CERTIFIED FROM: 2172 TO 9837 FEET MEASURED DEPTH.**

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 52 FEET ON A BEARING OF 32.12 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT PROJECTED MEASURED DEPTH OF 9880 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

Kristopher Bertsch
MWD COORDINATOR

Tie-in Date: 05/03/2011
Date Completed: 05/12/2011

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H
WILLIAMS COUNTY, ND
Rig:ENSIGN 71
PathFinder Office Supervisor: RICH ARNOLD
PathFinder Field Engineers: MIKE HANSEN
GARY SMITH

Survey Calculations by PathCalc v2.01 using Minimum Curvature

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:48.29.23.3808 N LON:104.0.36.5004 W
GRID Reference:NAD83 north dakota north Lambert
Ref GRID Coor: X: 1117595.8640 Y: 562849.1288
North Aligned To:TRUE NORTH
Total Magnetic Correction: 9.07° EAST TO TRUE
Vertical Section Plane: 0.26
Survey Vert. Reference: 16.00' Rotary Table To Ground
Altitude:2260.00' Ground To MSL

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
TIE INTO SURFACE CASING AT 2112' MD.										
2112.00	0.00	0.00	2112.00	0.00	0.00	0.00	0.00	0.00@	0.00	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
2172.00	0.97	279.42	2172.00	60.00	0.08	0.08 N	0.50 W	0.51@	279.42	1.62
2265.00	0.88	287.86	2264.99	93.00	0.42	0.43 N	1.96 W	2.00@	282.42	0.18
2359.00	1.14	291.99	2358.97	94.00	0.99	1.00 N	3.51 W	3.65@	285.93	0.29
2452.00	1.23	294.01	2451.95	93.00	1.73	1.76 N	5.28 W	5.57@	288.38	0.11
2544.00	1.49	297.70	2543.92	92.00	2.68	2.71 N	7.24 W	7.73@	290.54	0.30
2635.00	1.85	304.21	2634.89	91.00	4.05	4.09 N	9.50 W	10.35@	293.28	0.45
2727.00	1.49	313.35	2726.85	92.00	5.69	5.74 N	11.60 W	12.95@	296.34	0.49
2820.00	1.41	313.35	2819.82	93.00	7.30	7.36 N	13.31 W	15.21@	298.94	0.09
2912.00	1.49	316.25	2911.79	92.00	8.93	9.00 N	14.96 W	17.46@	301.03	0.12
3005.00	1.67	324.95	3004.75	93.00	10.91	10.98 N	16.58 W	19.89@	303.53	0.32
3099.00	1.67	331.98	3098.71	94.00	13.23	13.31 N	18.01 W	22.40@	306.48	0.22
3192.00	2.20	329.08	3191.66	93.00	15.95	16.04 N	19.56 W	25.30@	309.35	0.58
3285.00	2.20	328.11	3284.59	93.00	18.99	19.09 N	21.42 W	28.69@	311.70	0.04
3377.00	1.23	337.52	3376.55	92.00	21.40	21.50 N	22.73 W	31.29@	313.40	1.09
3470.00	0.97	341.56	3469.53	93.00	23.06	23.17 N	23.36 W	32.90@	314.76	0.29
3563.00	0.70	31.48	3562.52	93.00	24.30	24.40 N	23.32 W	33.75@	316.30	0.80
3656.00	0.70	63.12	3655.52	93.00	25.04	25.14 N	22.51 W	33.75@	318.16	0.41
3749.00	0.62	65.58	3748.51	93.00	25.51	25.61 N	21.55 W	33.47@	319.92	0.09
3840.00	0.44	55.65	3839.51	91.00	25.91	26.01 N	20.81 W	33.31@	321.33	0.22
3933.00	0.53	65.32	3932.50	93.00	26.30	26.39 N	20.13 W	33.19@	322.67	0.13
4026.00	0.53	65.58	4025.50	93.00	26.66	26.75 N	19.34 W	33.01@	324.13	0.00
4119.00	0.53	58.64	4118.49	93.00	27.06	27.15 N	18.58 W	32.90@	325.61	0.07
4211.00	0.44	56.53	4210.49	92.00	27.48	27.56 N	17.93 W	32.88@	326.96	0.10
4305.00	0.35	48.44	4304.49	94.00	27.87	27.95 N	17.41 W	32.93@	328.09	0.11

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H
WILLIAMS COUNTY, ND
RIG:ENSIGN 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
4397.00	0.26	0.28	4396.49	92.00	28.27	28.35 N	17.20 W	33.16@	328.76	0.28
4490.00	0.26	330.75	4489.49	93.00	28.67	28.74 N	17.30 W	33.55@	328.96	0.14
4583.00	0.62	124.73	4582.49	93.00	28.56	28.64 N	16.99 W	33.30@	329.32	0.93
4676.00	0.26	156.29	4675.48	93.00	28.09	28.16 N	16.49 W	32.64@	329.65	0.45
4769.00	0.09	304.91	4768.48	93.00	27.94	28.01 N	16.47 W	32.49@	329.55	0.37
4862.00	0.09	359.84	4861.48	93.00	28.05	28.13 N	16.53 W	32.62@	329.56	0.09
4956.00	0.26	68.31	4955.48	94.00	28.20	28.28 N	16.33 W	32.65@	330.00	0.26
5049.00	0.44	69.01	5048.48	93.00	28.41	28.48 N	15.80 W	32.57@	330.98	0.19
5141.00	0.70	63.83	5140.48	92.00	28.79	28.86 N	14.97 W	32.51@	332.59	0.29
5234.00	0.79	25.42	5233.47	93.00	29.62	29.69 N	14.18 W	32.90@	334.47	0.53
5326.00	0.70	26.47	5325.46	92.00	30.70	30.76 N	13.66 W	33.66@	336.06	0.10
5419.00	0.62	25.86	5418.45	93.00	31.66	31.73 N	13.18 W	34.36@	337.43	0.09
5510.00	0.62	33.42	5509.45	91.00	32.52	32.58 N	12.70 W	34.97@	338.70	0.09
5604.00	0.62	32.62	5603.44	94.00	33.38	33.43 N	12.14 W	35.57@	340.04	0.01
5696.00	0.44	41.94	5695.44	92.00	34.06	34.11 N	11.64 W	36.05@	341.16	0.22
5788.00	0.44	58.64	5787.44	92.00	34.51	34.56 N	11.10 W	36.30@	342.19	0.14
5881.00	0.35	53.72	5880.43	93.00	34.87	34.91 N	10.57 W	36.48@	343.16	0.10
5974.00	0.35	97.58	5973.43	93.00	35.00	35.05 N	10.06 W	36.46@	343.99	0.28
6067.00	0.35	104.17	6066.43	93.00	34.89	34.94 N	9.50 W	36.21@	344.79	0.04
6159.00	0.26	105.57	6158.43	92.00	34.77	34.81 N	9.03 W	35.96@	345.46	0.10
6252.00	0.26	116.03	6251.43	93.00	34.62	34.66 N	8.63 W	35.72@	346.01	0.05
6345.00	0.18	106.28	6344.43	93.00	34.49	34.53 N	8.30 W	35.52@	346.48	0.09
6438.00	0.18	51.35	6437.43	93.00	34.54	34.58 N	8.05 W	35.51@	346.89	0.18
6531.00	0.26	108.74	6530.43	93.00	34.57	34.60 N	7.74 W	35.46@	347.40	0.24
6624.00	0.44	144.33	6623.43	93.00	34.21	34.25 N	7.33 W	35.02@	347.92	0.29
6717.00	0.88	139.15	6716.42	93.00	33.39	33.42 N	6.65 W	34.07@	348.74	0.48
6811.00	0.70	117.61	6810.41	94.00	32.58	32.60 N	5.67 W	33.09@	350.13	0.37
6905.00	0.70	123.15	6904.40	94.00	32.00	32.02 N	4.68 W	32.36@	351.68	0.07
6998.00	0.62	128.51	6997.40	93.00	31.38	31.40 N	3.81 W	31.63@	353.08	0.11

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H
WILLIAMS COUNTY, ND
RIG:ENSIGN 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
7092.00	0.09	73.05	7091.40	94.00	31.09	31.10 N	3.34 W	31.28@	353.86	0.61
7184.00	0.62	326.79	7183.39	92.00	31.53	31.54 N	3.55 W	31.74@	353.58	0.71
7278.00	0.88	316.60	7277.39	94.00	32.47	32.49 N	4.32 W	32.78@	352.42	0.31
7369.00	1.06	312.64	7368.37	91.00	33.55	33.57 N	5.42 W	34.01@	350.83	0.21
7462.00	1.41	314.67	7461.35	93.00	34.93	34.96 N	6.87 W	35.63@	348.88	0.38
7555.00	1.23	325.21	7554.33	93.00	36.54	36.58 N	8.25 W	37.50@	347.29	0.32
7649.00	1.14	331.36	7648.31	94.00	38.19	38.23 N	9.28 W	39.34@	346.36	0.17
7742.00	1.23	341.21	7741.29	93.00	39.94	39.99 N	10.04 W	41.23@	345.90	0.24
7835.00	1.41	354.13	7834.26	93.00	42.02	42.07 N	10.48 W	43.36@	346.01	0.37
7928.00	1.76	2.30	7927.23	93.00	44.59	44.64 N	10.54 W	45.86@	346.72	0.45
8021.00	1.85	4.67	8020.18	93.00	47.51	47.56 N	10.36 W	48.67@	347.71	0.13
8114.00	1.67	23.40	8113.14	93.00	50.25	50.30 N	9.70 W	51.23@	349.09	0.64
8208.00	1.67	33.42	8207.10	94.00	52.66	52.70 N	8.40 W	53.36@	350.94	0.31
8301.00	1.93	33.50	8300.05	93.00	55.10	55.14 N	6.79 W	55.55@	352.98	0.28
8394.00	2.11	36.49	8392.99	93.00	57.80	57.82 N	4.91 W	58.03@	355.15	0.22
8488.00	1.93	63.12	8486.94	94.00	59.91	59.93 N	2.47 W	59.98@	357.64	1.01
8581.00	2.29	72.44	8579.87	93.00	61.20	61.19 N	0.70 E	61.20@	0.66	0.53
8674.00	2.46	87.73	8672.80	93.00	61.85	61.83 N	4.47 E	62.00@	4.13	0.70
8767.00	2.99	94.85	8765.69	93.00	61.75	61.71 N	8.88 E	62.34@	8.19	0.68
8861.00	3.52	115.07	8859.54	94.00	60.34	60.28 N	13.94 E	61.87@	13.02	1.34
8954.00	3.34	143.63	8952.38	93.00	56.97	56.89 N	18.13 E	59.71@	17.68	1.83
9048.00	2.46	148.28	9046.26	94.00	53.06	52.97 N	20.81 E	56.91@	21.45	0.97
9140.00	1.67	147.41	9138.20	92.00	50.26	50.16 N	22.57 E	55.00@	24.23	0.86
9233.00	1.32	146.53	9231.17	93.00	48.23	48.12 N	23.89 E	53.73@	26.41	0.38
9327.00	0.97	147.32	9325.15	94.00	46.66	46.55 N	24.92 E	52.80@	28.16	0.37
9418.00	0.62	57.15	9416.14	91.00	46.28	46.17 N	25.75 E	52.86@	29.15	1.27
9419.00	0.70	141.43	9417.14	1.00	46.28	46.17 N	25.76 E	52.87@	29.16	88.79
9511.00	0.53	135.90	9509.14	92.00	45.54	45.42 N	26.41 E	52.54@	30.17	0.20
9537.00	0.44	125.09	9535.14	26.00	45.40	45.28 N	26.57 E	52.50@	30.41	0.49

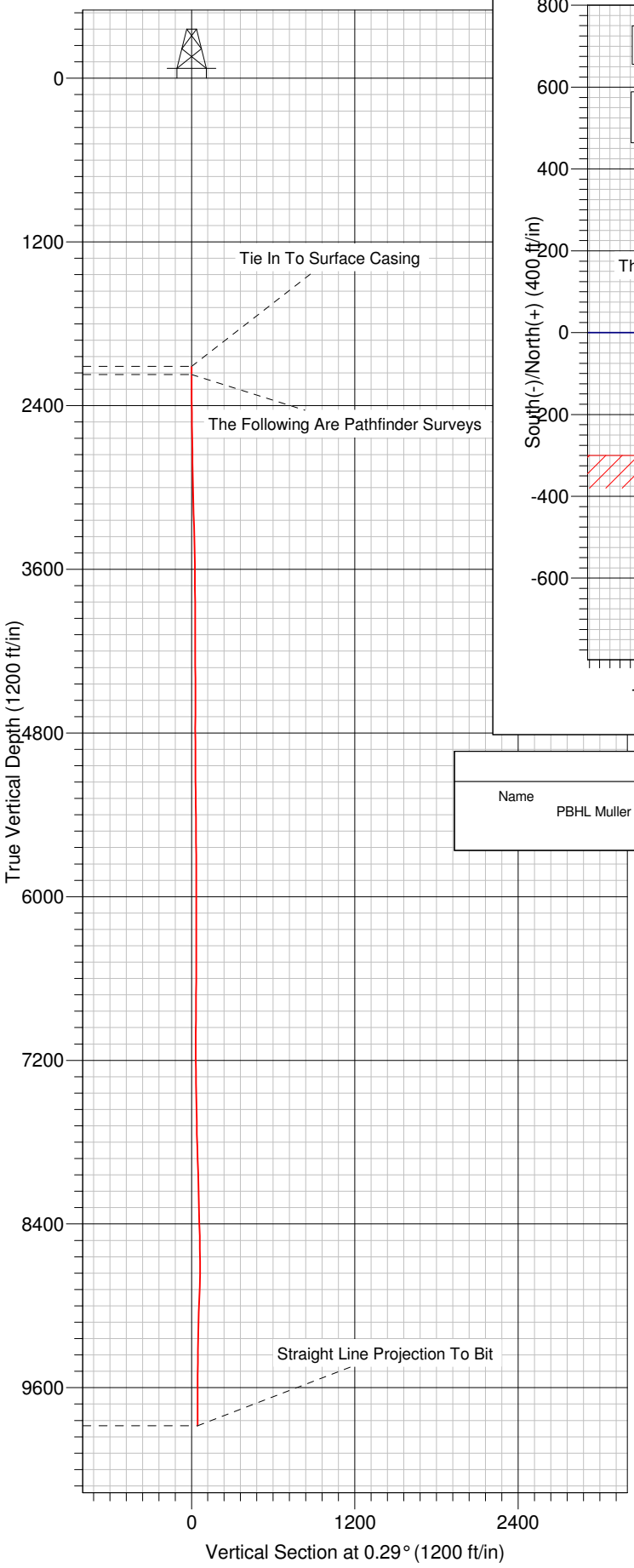
PathFinder Energy Services, Inc.
Survey Report

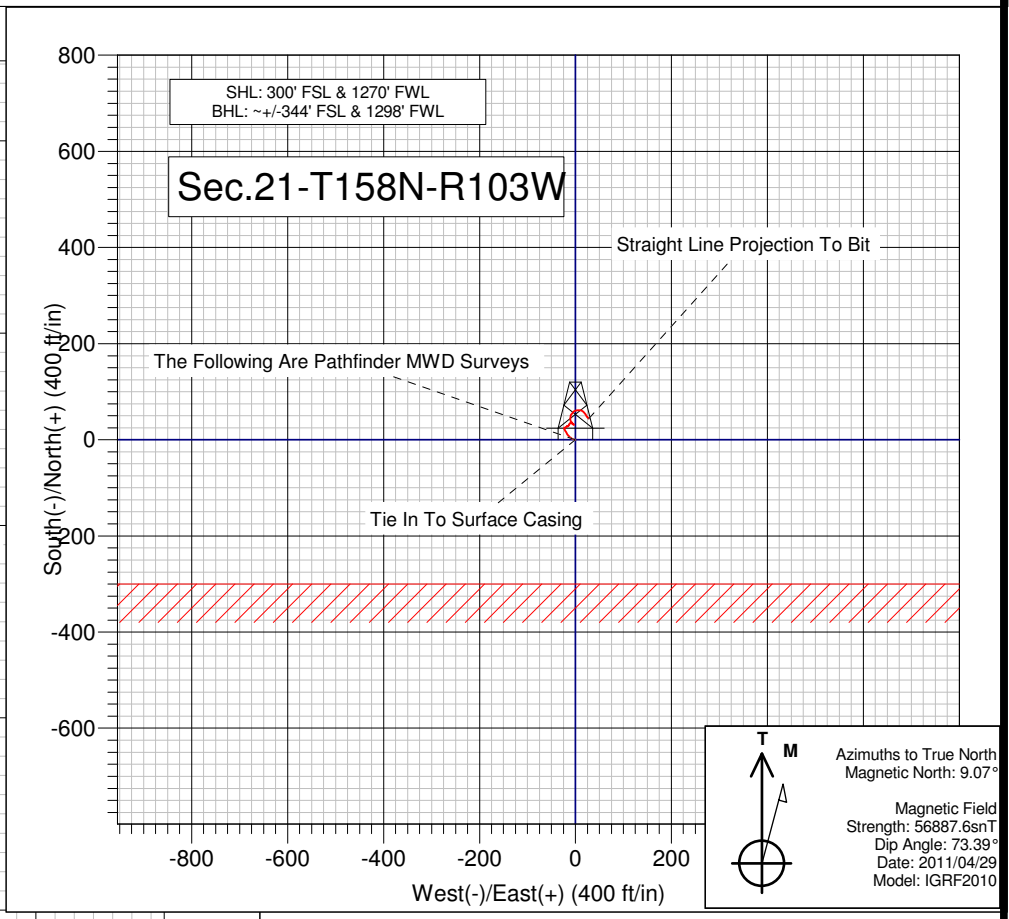
G3 OPERATING, LLC
MULLER 1-21-16H
WILLIAMS COUNTY, ND
RIG:ENSIGN 71

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
9604.00	0.44	136.25	9602.13	67.00	45.06	44.94 N	26.96 E	52.41@	30.96	0.13
9697.00	0.26	137.48	9695.13	93.00	44.65	44.53 N	27.35 E	52.26@	31.56	0.19
9790.00	0.18	116.56	9788.13	93.00	44.43	44.31 N	27.62 E	52.21@	31.94	0.12
9837.00	0.09	146.35	9835.13	47.00	44.37	44.24 N	27.71 E	52.20@	32.06	0.24
STRAIGHT LINE PROJECTION TO BIT.										
9880.00	0.09	146.35	9878.13	43.00	44.31	44.19 N	27.75 E	52.18@	32.12	0.00

Company: G3 Operating, LLC
Project: Williams Co., ND
Site: Sec.21-T158N-R103W
Well: Muller 1-21-16H
Wellbore: Wellbore #1
Survey: Pilot Hole (Muller 1-21-16H/Wellbore #1)

PATHFINDER
A Schlumberger Company





WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL Muller 1-21-16H	9878.1	10007.2	46.1	572843.75	1118097.99	48° 31' 2.131 N	104° 0' 35.815 W	Point

WELL DETAILS: Muller 1-21-16H

Ground Level: 2260.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	562849.05	1117595.89	48° 29' 23.380 N	104° 0' 36.500 W	

ANNOTATIONS

TVD	MD	Annotation
2112.0	2112.0	Tie In To Surface Casing
2172.0	2172.0	The Following Are Pathfinder MWD Surveys
9878.1	9880.0	Straight Line Projection To Bit

PathFinder Energy Services, Inc.
BHL Report

Tie-in Date: 05/03/2011
Date Completed: 05/12/2011

G3 OPERATING, LLC
MULLER 1-21-16H
WILLIAMS COUNTY, ND
Rig:ENSIGN 71
PathFinder Office Supervisor: RICH ARNOLD
PathFinder Field Engineers:MIKE HANSEN
GARY SMITH

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:48.29.23.3808 N LON:104.0.36.5004 W
GRID Reference:NAD83 north dakota north Lambert
Ref GRID Coor: X: 1117595.8640 Y: 562849.1288
North Aligned To:TRUE NORTH
Total Magnetic Correction: 9.07° EAST TO TRUE
Vertical Section Plane: 0.26
Survey Vert. Reference: 16.00' Rotary Table To Ground
Altitude:2260.00' Ground To MSL

Measured Depth	9880.00	(feet)
Inclination	0.09	(deg)
Azimuth	146.35	(deg)
True Vertical Depth	9878.13	(feet)
Vertical Section	44.31	(feet)
Survey X cord	1117623.61	(feet)
Survey Y cord	562893.32	(feet)
Survey Lat	48.48995247 N	(deg)
Survey Lon	104.01003301 W	(deg)
Rectangular Corr. N/S	44.19 N	(feet)
Rectangular Corr. E/W	27.75 E	(feet)
Closure Distance	52.18	(feet)
Direction of Closure	32.12	(deg)
Dogleg Severity	0.00	(deg/100ft)

20552

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ND OIL & GAS
DIVISION

G3 Operating, LLC.

Muller 1-21-16H

Section 21 T158N R103W
Williams County, North Dakota

Emily Lovberg
Wellsite Geologist

NCS NESET CONSULTING SERVICE

117 North Welo Street PO Box 730 Tioga ND, 58852 701-664-1492

10-11

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WELL SUMMARY

OPERATOR:	**G3 Operating, LLC.**	
LEASE:	***Muller 1-21-16H***	
API:	33-105-02157	
LOCATION:	Field:	Wildcat
	Footage:	300' FSL & 1,270' FWL
	Legal:	Section 21 T158N R103W
	Bottom hole:	251' FNL & 1,306' FWL Section 16 T158N R103W
	County:	Williams County, North Dakota
ELEVATION:	Kelly Bushing:	2,276'
	Ground Level:	2,260'
SPUD DATE:	April 28, 2011	
CEASE DRILLING:	June 1, 2011	
TOTAL DEPTH:	Lateral #1:	14,988' MD 9,591.68' TVD 5,622' VS
	Sidetrack #1:	19,333' MD 9,515.51' TVD 10,006.91' VS
CONTRACTOR:	Rig:	Ensign US Drilling #71
	Toolpusher:	Bruce Ehlke, Shane Cundiff
	Drillers:	Ethan Bailey, Chris Peterson, Eli Kleinsasser, Peter Kleinsasser
CASING RECORD:	Surface:	9 5/8" casing to at 2,112'
	Intermediate:	7" casing set to 9,982'
MUD RECORD:	Mud company:	Dynamic Drilling Fluids
	Mud engineer:	Les Holgate
	Mud up depth:	2,122'
	Mud type:	Invert for curve, Salt water through lateral.
DIRECTIONAL DRILLING PROGRAM:	Directional company:	Path Finder
	Directional drillers:	Chris Hlucny, Jeremy Cunningham
	MWD company:	Path Finder
	MWD supervisors:	Mike Hansen, Gary Smith
MUDLOGGING PROGRAM:	Mud logging company:	Neset Consulting Service
	Mudloggers:	Emily Lovberg, Matt Buckalew, KatieSchwabe
	Services:	NCS Total Gas & Chromatograph

SAMPLE PROGRAM:	Caught:	30'
	Examined:	All
	Saved:	All
	Quality:	Good
CORING PROGRAM:	Coring Co:	Baker Hughes Inteq
	Coring Size:	150'
	Coring Depth:	9,580' – 9,730'
	Coring Recovered:	148.5'
LOGGING PROGRAM:	Wireline Logging Co:	Weatherford
	Logs:	Neutron, Density, Induction, Gamma Ray, Spectralog, Borehole Profile
WELL STATUS:	Awaiting completion	
COMPANY ENGINEER:	Aldo Gurmendi	
WELLSITE SUPERVISOR:	Leon Matej, Ricky Mills	
COMPANY GEOLOGIST:	Roger Hively	
WELLSITE GEOLOGIST:	Emily Lovberg	

GEOLOGIC SUMMARY

The G3 Operating, LLC Muller 1-21-16H well was drilled as a lateral well targeting the Middle Bakken Formation. The well is located in the SW SW Section 21 T158N, R103W Williams County, North Dakota. This well spud on April 28, 2011. The curve was landed at a measured depth (MD) of 9,997' and the lateral reached a total measured depth of 19,333' MD / 9515.53' TVD at 1:45 pm Mountain Daylight Time (MDT) on June 1, 2011. Oil based mud was used during the vertical and curve section of the well, and salt water was used during the lateral section. The Kelly Bushing for the Muller 1-21-16H well was 2,276 feet, and the ground elevation was 2,260 feet. Well site geological service began at a measured depth of 8,160 feet in the Charles Salt Formation and continued through to total depth (TD). Thirty foot lagged samples were collected to a depth of 8,300'MD and then 10' samples were collected from a depth of 8,300'MD to a depth of 8,450' MD to aid in closer inspection of the Ratcliffe. . Thirty foot samples resumed after 8,450'MD and continued to Total Depth at 19,333' MD. All samples were washed, catalogued, and saved for archive at the North Dakota Geological Survey Core Library in Grand Forks, North Dakota, and at G3 Operating, LLC in Denver, Colorado.

Vertical plus Core ***8,160' – 9730' MD***

Vertical plus Curve ***8,160' – 9,997' MD***

Logging services began at 8,160 feet of measured depth in The Charles Formation on May 4, 2011, The Total Gas detection system was recalibrated and tested before logging depth, with system functioning correctly. Drill rates ranged from .3 to 4.8 minutes per foot. Gas ranged from 17 to 505 units.

Base of the Last Salt ***8,222' MD*** ***8,221' TVD*** ***-5, 9453' SS***

The Base of the Last Salt (BLS) was entered at a measured depth of 8,222' and a true vertical depth of 8,221' based on comparable ROP rates from offset wells, and sample lithology. BLS Samples consisted mostly of anhydrite, with siltstone stringers and salt. Gas averaged 17 units of Total Gas throughout the Charles.

Ratcliffe ***8,290' MD*** ***8,289' TVD*** ***-6,013' SS***

The Ratcliffe was entered at a measured depth of 8,290' and a true vertical depth of 8,298'. The top of the Ratcliffe was picked from an abrupt drilling break and a change in lithology from mostly anhydrite to mostly limestone. Lithology of the Ratcliffe was represented by a dark brown , cream brown, cream, calcareous, pelloidal packstone, which in parts had poorly sorted coated grains, secondary, sucrosic, dolomitic cement, and good fenestral/vuggy porosity, with a bright white fluorescence, fast milky white/green streaming cut, and a residual light brown oil residue after a cut. Gas in the Ratcliffe was minimal.

Mission Canyon	***8,417' MD***	***8,416' TVD***	***-6,141' SS***

The Mission Canyon Formation was picked at a measured depth of 8,417' and a true vertical depth of 8,416' based upon comparable ROP and gas data from an offset log, and lithology. Samples in the Mission Canyon were predominantly a dark brown, cream, brown, dolomitic packstone, with sub rounded to sub angular microcrystalline grains which were poorly sorted, with calcitic and dolomitic cement, a silty matrix, anhydrite nodules, and cherty sections, with a bright white fluorescence, a fast milky white/green streaming cut, and a residual light brown residue after a cut. Gas peaked at 237 units in the Mission Canyon Formation.

Lodgepole	***9,095' MD***	***9,093' TVD***	***-6,817' SS***

The Lodgepole Formation came in at 9,095 feet measured depth and 9,093 feet of true vertical depth, defined by a drilling break and a change in the sample lithology. Drill rates in the Lodgepole ranged from 3 to 8 minutes per foot rotating, with gas ranging from 96 to 248 units. Typical samples of Lodgepole were represented by gray, light gray, dark gray, dark brown, limestone with microcrystalline grains, massive, argillaceous, hard, oolitic and pelloidal, horizontal laminations in part, dolomitic red , orange, white, tan, agillaceous stringers, and samples exhibited a spotty yellow fluorescence, fast milky cut. Samples in the lower section of the Lodgepole starting at approximately 9590' MD began exhibiting a light brown oil stain and showed a residual light brown oil residue after cut. Gas counts in the Lodepole Formation averaged 22 Total Gas units.

Coring Section	***9,580'MD***	***9,578'TVD***	***-7,302'SS***

The Muller 1-21-16H well was cored from a depth of 9,580' MD to a depth of 9,730' MD and included samples of the Lodgepole, Upper Bakken Shale, Middle Bakken, Lower Bakken Shale and the Three Forks Porosity Zone. Coring was completed in 8 hours. The single piece core was cut into 30' sections, moved to the ground and then cut it 3' sections, while maintained in its original aluminum sleeve. The three foot sections were marked, capped and sealed on each end and immediately transported to Denver for further lab analysis.

Upper Bakken Shale	***9598'MD***	***9598'TVD***	***-7,322'SS***
Middle Bakken	***9,612'MD***	***9,610'TVD***	***-7,334'SS***
Lower Bakken Shale	***9,653' MD***	***9,651'TVD***	***-7,375'SS***
Three Forks	***9,663' MD***	***9,661'TVD***	***-7,385'SS***

Wireline Logs

A quad suite of wireline logs consisting of a neutron density log, an induction log, an acoustic log and a spectralog, was run from surface to a depth of 9,880' MD into the Three Forks formation. From these logs, a target landing for the curve was established at 9,628' TVD.

Curve Section

After the core was completed, the wellbore was cemented back up to KOP at 9,050' MD. The initial plug did not set so a second plug was cemented in place. Drilling of the curve was drilled with a Smith MIDI613 bit. Because wireline logs had been run through the Middle Bakken, correlation markers with the Agnes Burns #1 offset well were not needed to establish a target landing. Instead, a target landing TVD was picked directly from the wireline logs and established at 9628' TVD.

The curve was landed at 9,997' MD / 9,620.36' TVD which was 8' TVD above the planned target landing. This high landing was due to an inability to obtain build rates from the mud motor. At that point, the crew tripped out of the hole to pick up tools and begin casing.

Upper Bakken Shale 9,600' MD 9,598' TVD -7,322' SS

The Bakken Shale was entered at 9,598' TVD and was 12 feet thick in this well. Gas peaked at 505 units of Total Gas and Gamma reached 606 units api in the Upper Bakken Shale. A typical sample of the Bakken Shale was black, blocky, gritty, very well indurated, silty, calcareous laminations, carbonaceous, red dolomite stringer, uneven patchy green fluorescence, fast fluorescent white cut, brown residual stain after cut

Middle Bakken 9,612'MD 9,610'TVD -7,334'SS

The Middle Bakken came in at a measured depth of 9,612' and a true vertical depth of 9,610'. The Middle Bakken was marked from a drop in gamma and a change in lithology. The Middle Bakken exhibited as siltstone: gray, light gray, lithic, subangular grains, microsucrosic, wavy horizontal laminations, poorly indurated, carbonaceous, calcareous, dolomitic in part, red/orange dolomite stringers, spotty brown oil stains, uneven spotty green fluorescence, **fast cloudy white cut, slow white streamers**.

Lateral Section

The lateral section of the Muller 1-21-16H well began on May 21, 2011 at 5:34am MDT at 9,998' MD at a 90.35 degrees drilling updip. This drilling updip was calculated from the offset Agnes Burns 41 well which was approximately ½ mile north of the Muller well. The lateral wellbore started two feet below the Packstone clean gamma portion of the Lithofacies 3 zone of the Middle Bakken. It was expected that gamma readings would be used to verify vertical location of the wellbore as the lateral progressed but it quickly became apparent that the ratty appearance of the gamma ray signature would make this

challenging. Changes in sample lithology were subtle between the lower Middle Bakken Lithofacies 2 zone and the Middle Bakken Central Basin Facies zone and were only later recognized by an absence in gas and siltier samples. On, May 24, 2011 at 14,940' MD, the gamma rose to 150 api and ROP quickly increased to over 200 ft/hr. Drilling was halted and bottoms up were circulated. Samples were examined and revealed an extremely soft, black/brown shale which was highly pyritic. Assumptions were that drilling was proceeding upward through the Middle Bakken formation so it was thought that this sample represented a small but very argillaceous sequence just below the Upper Bakken Shale. After phone calls with all involved parties, a decision was made to slowly drill ahead but move down in formation. Immediately after returning to drilling, the gamma shot up over 1140 api and gas rose to 443 units of Total Gas while ROP maintained a rate of over 200+ ft/hr. Drilling was interrupted again and after one more sample was examined that presented as a blocky, firm, black, shale, it was established that the Bakken Shale had been struck. A conference call with personnel and partners ensued and a review of full MWD gamma revealed that the shale strike had been a Lower Bakken Shale encounter. A formation dip calculation was made on this evidence and revealed that the true formation dip was 90.6 to 90.65 degrees.

A decision was made to sidetrack the well at 12,160' MD. An initial drilling dip of 91 degree was decided upon in order to move the wellbore up in formation to the Packstone, Lithofacies 3 clean gamma zone. The plan was to drill updip just past the clean gamma marker and then change the dip rate to a 90.6 degree dip which would equate with the calculated Middle Bakken formation dip.

Sidetrack # 1

On May 25, 2011, time drilling for Sidetrack #1 commenced. A Hughes D411ST bit was used for troughing and time drilling Time drilling started at 12160' MD and the wellbore was time drilled to 12,177' MD After sliding to 12,190' MD, drilling began with the use of a SMITH MSI613MQBPX bit. Drilling proceeded to 14403' MD until the low clean gamma reading of 56 api was reached. Samples became less silty, more lithic and dolomitic and gas readings increased as the wellbore moved towards the Lithofacies 3, Packstone zone. Once the clean gamma zone was reached, samples became extremely sandy, and gas dropped off dramatically to a minimal reading of 17 units of Total Gas. The drilling dip was adjusted to 90.58 degrees at that point. Soon afterwards, directional support and geology support decided that drilling would slowly move up to the clean gamma zone reading of 56 api every 1000' to 1500' in order to establish vertical location in the Middle Bakken. This clean gamma signature was acknowledged by geology support as the only markedly definitive marker in this Middle Bakken section except for the disappearance of gas that occurred between the transition from the Central Basin facies and Lithofacies 2, at ten feet above the Lower Bakken Shale. Drilling proceeded for the next 2600' feet but build rates did not average over 96 degrees and as a result, the 56 api gamma marker was never reached and the samples showed that gas was decreasing and the samples were becoming siltier and slowly losing the laminations of the Central Basin Facies. This indicated that we were moving down in section in the Middle Bakken from the top of the Central Basin Facies to the bottom of this facies. At 16,717' MD, the

wellbore took a dramatic drop from the previous survey of 92.07 inclination to 89.43 inclination Another attempt was made to increase the build rate and bring the inclination up above 90.58 degrees. At 18,893' MD the survey showed that we had reached an average dip of 90.6 degrees. The next 4 surveys showed the dip rate was indeed climbing to 90.7 degrees but the next survey at 19,288' MD again showed a drop in dip by more than 1 degree. At that time, the decision was made to TD the well..

Conclusion

The Muller 1-21-16H sidetrack #1 reached a total measured depth of 19,333' and true vertical depth of 9515.53' at 1:45 pm MDT on June 1, 2011. The erratic behavior of the gamma made it difficult to correlate for dip calculations and as a result the wellbore was drilled with a large allowance for a target window. This well is currently awaiting completion.

Emily Lovberg
Wellsite Geologist

DAILY LOG OF OPERATIONS

5:00 AM DEPTH MDT

DATE	DEPTH	FOOTAGE	DAY	FORMATION	OPERATIONS
28-Apr-2011	0	1120	1	SURFACE	Rig up,change shaker screens, OD/ID strap collars/IADC checkoff,pump across hole, check for leaks and pop offs,stroke counters,change seqt in kill line valve,move pit pump to shaker side,fix rolled up pit liner,mix SAPP in suction tank,conduct pre-spud safety meeting, spud well, drill 90'-250', shut down and clean out mud ring from conductor, func COM, drill from 250' - (fight mud rings),dev survey, drill 500' - 920', dev survey, drill 920' - 1200'
29-Apr-2011	1,120	2002	2	PIERRE/BASE FOXHILLS	Set COM and drill from 1200 - 1942, LUBE rig/svc Top Drive,drill 1942'-2122',pump high visc sweep,circ 5080 stks,dev survey,wiper trip,clean bit,TIH, condition mud and circulate,TOH to 8",wait on weather
30-Apr-2011	2,122	0	3	PIERRE/BASE FOXHILLS	Wait on cemnters and weather
1-May-2011	2,122	31	4	PIERRE/BASE FOXHILLS	TIH, wash to bottom last 3 stds, set COM, circ BU,mix/pump pill high vis sweep, circ hole clean,TOH to collars, TIH, circ hole clean,TOH to collars, TIH, rig svc,circ
2-May-2011	2,153	2259	5	PIERRE/BASE FOXHILLS	Wait on cement,cut off conductor/casing,weld on wellhead,nipple up BOP,test BOP,wait on new test equipment, clean mud tanks,test BOP and casing to 1500 PSI for 30 minutes,nipple up rotating hed/fill mud tanks with invert,PU dir tools,TIH,drill cement/float/shoe, drill 2122- - 2160'
3-May-2011	4,412	1129	6	GREENHORN	Drill from 2160' - 3700', lube rig, func BOP,drill 3700'-5545', CIIR BU, POOH for motor
4-May-2011	5,541	1377	7	DAKOTA	Check COM, TOH for mud motor,Dir work,X/O mud motor and bit,replace MWD collar and X/O bad threads,check COM, TIH, fill half way and test tool, drill 5545'-5745',lube rig, func BOP,drill 5745'-6979',dev surveys, connections
5-May-2011	6,918	1053	8	MINNELUSA	Check COM, drill from 6979' - 7590',lube rig, func BOP,drill 7590' - 7979',dev surveys, connections
6-May-2011	7,971	479	9	CHARLES	Check COM, drill from 7979' - 8225', lube rig, func BOP,drill 8225'-8458', check COM
7-May-2011	8,450	380	10	MISSION CANYON	Check COM, drill from 8458' - 8630', lube rig, func BOP, drill from 8630'-8830', mix dry pill, pull rubber, POOH for bit,func /com
8-May-2011	8,830	226	11	MISSION CANYON	Circulate fresh water around to wash salts, build heavy pill,TOH for motor and bit,lube rig, func BOP, Dir work, X/O motor and bit,change bend in motor,check COM, TIH, break circ.

DAILY LOG OF OPERATIONS

5:00 AM DEPTH MDT

DATE	DEPTH	FOOTAGE	DAY	FORMATION	OPERATIONS
9-May-2011	9,056	467	12	MISSION CANYON	Check COM, drill from 9663'-9070', circ, mix heavy pill, set/check com/trip out of hole,dir work,change bit and MWD,check COM, TIH,install rubber/Brk circ, set COM, drill 9070'-9550'
10-May-2011	9,523	147	13	LODGEPOLE	Func COM, drill from 9550' - 9580', circ, clean/mix/pump slug, TOH for core tools, lube rig, func BOP, PU bit and core tools, set COM, TIH filling every 30 stds, fill pipe and wash to bottom, core from 9580' to 9715'
11-May-2011	9,670	200	14	THREE FORKS	Func com, core from 9715' to 9730', circ BU,mix/pump slug,func COM, TOH w core,lay down core,make up bit,scrive, install MWD,TIH,cut off 156' drill line,fill pipe,set COM, ream from 9461' - 9730', drill from 9730' - 9880,cond mud, circ hole clean
12-May-2011	9,870	10	15	SOURIS RIVER	Circ/clean ,hole, mix/pump slug,TOH for logs,lube rig,func BOP, Safety Mtg,RU loggers, run wireline logs,laydown logging tools,TIH open ended with 4.5" DP, install rotating rubber,PU 17 joints/wash to bottom/tag bottom @ 9880', circ BU,TOH to 9750', RU Halliburton cementers/sfty mtg,pressure test cement lines to 5000 PSI
13-May-2011	9,880	0	16	SOURIS RIVER	Cement, plug back, trip out 12 stds, circ 2 BU above cement plug, mix/pump slug,TOH for BHA, lay down dir tools, brea monel and pull MWD, TIH drill collars, and lay down, lube rig, func BOP, service top drive, X/O gear end oil, PU BHA, make up bit/scribe motor, install MWD, strap, tally,PU HWDP, func COM, TIH, fill and test every 30 stds, wash/ream tight hole from 7645 - 7715, TIH to 8626', wash to 9050', did not tag cement, circulate
14-May-2011	9,004	0	17	LODEGPOLE	Circulate above cement,ream cement from 9050'-9180', circulate BU, TOH wet, motor failed to drain, check COM, TIH open ended, condition mud and circ BU,safety mtg, RU Halliburton,cement, plug back, check com, trip out 12 stds, condition mud, circulate 2 btms up, pump heavy pill for dry job, TOH
15-May-2011	3,632	0	18	LODEGPOLE	Wait on cement, make BHA, bit and TIH,
16-May-2011	9,050	9048	19	LODEGPOLE	Func BOP, dril 9058'-9215', Lube Rig, drill 9215' - 9371', repair pump #1, reprogram MWD,drill 9371' - 9420'
17-May-2011	9,403	343	20	LODEGPOLE	Drill 9420' - 9621', Lube Rig, Func BOP, Dev surveys, check com, drill 9621' - 9750', dev surveys

DAILY LOG OF OPERATIONS
5:00 AM DEPTH MDT

DATE	DEPTH	FOOTAGE	DAY	FORMATION	OPERATIONS
18-May-2011	9,740	337	21	LODEGPOLE	Dril 9750' - 9950', lube rig, func BOP, dev surveys,check COM, drill 9950'-9971', surveys, circ clean hole, build hvy pill, set/check COM, TOH to 9000' for wiper trip, circ BU, pump hvy slug for dry pipe, safety mtg, RU/laydown truck, lay down 4 1/2' drill pipe
19-May-2011	9,997	257	22	MIDDLE BAKKEN	check COM, LD 4.5", 6.5" DC, HVY WT, Lay out Dir tools, pull wear ring, RU casing crew, safety mtg, run casing
20-May-2011	9,997	0	23	MIDDLE BAKKEN	Install bit guide, wear ring, pack off, xo pipe rams, test BOP to 5000 PSI, casing to 1500 PSI for .5 hrs, adj top drive, makeup BHA/scribe,clean mud tanks, dril out mouse hole, prep pipe to PU, slip cut 119' drill line
21-May-2011	9,997	0	24	MIDDLE BAKKEN	Drill from 10010' - 10496', lube rig, func BOP, work on pump,repair 4" valve on #2 pump, check com, drill from 10490' to 10992'
22-May-2011	10,968	971	25	MIDDLE BAKKEN	Drill from 10992'-11665, lube rig, func BOP, dev survey,check COM, drill 11665' - 12425', dev survey
23-May-2011	12,367	1399	26	MIDDLE BAKKEN	Drill from 12425'-13278', Lube rig, func BOP, dev survey, check com, drill from 13278'-14090', dev survey
24-May-2011	14,031	1664	27	MIDDLE BAKKEN	Drill from 14,090'-14,768', func COM, lube rig, srv Top Drive,func pipe rams, drill from 14,768'-14,862', func COM, drill 14862'-14970',circ BU,drill 14970-14988',circ BU spls,TOH for sidetrack, change bit and angle mud motor
25-May-2011	14,988	957	28	MIDDLE BAKKEN	Scrive and adjust Motor, makeup bit, change out MWD, func Blind Rams, set com and TIH with sidetrack bit, 128 stds, fill every 30 stds, trough from 12140'- 12160', inch drill from 12160'-12163'
26-May-2011	14,988	0	29	MIDDLE BAKKEN	Time drill from 12185'-12197', pump survey/circ BU sample,orient tool face, test run into dog leg with pumps off, func COM, TOH, fill every 5 stds, break bit, re-clock motor, MWD, make up bit, func blind ram, TIH 3 stds, PU reamer,func COM, TIH, fill every 35 stds, cut 103' drill line, trip to BTM, orient into side track, func COM, drill from 12197'-12377'
27-May-2011	12,351	191	30	MIDDLE BAKKEN	Drill from 12377'-12795', Lube rig, svc Top Drive,drill 12795'-12915', func COM, drill 12915'-13551'
28-May-2011	13,521	1244	31	MIDDLE BAKKEN	func COM, drill 13551'-13929, lube rig, svc Top Drive, drill 13929'-14260', func COM, drill 14260'-14930'

DAILY LOG OF OPERATIONS

5:00 AM DEPTH MDT

DATE	DEPTH	FOOTAGE	DAY	FORMATION	OPERATIONS
29-May-2011	14,902	1381	32	MIDDLE BAKKEN	Func COM, drill 14930' - 15533', lube rig, svdc Top Drive, drill 15533'-15650',func COM, drill 15650' - 16516'
30-May-2011	16,450	1623	33	MIDDLE BAKKEN	Func COM, drill 16515' - 16951', lube rig, svc Top Drive, grease crown, func BOP, drill 16951' - 17050', func COM, drill 17050' - 17680'
31-May-2011	17,664	1214	34	MIDDLE BAKKEN	check COM, drill from 17680' - 18320', lube rig, func BOP, drill from 18320' - 18922'
1-Jun-2011	18,875	1211	35	MIDDLE BAKKEN	check COM, drill from 18922' - 19154', lube rig, func BOP, replace swab in #2 pump, drill 19154' - 19333', circ hi visc sweep down, check COM, TOH for reamer assbly

BIT RECORD

BIT NO.	BIT SIZE	BIT MFGR	BIT TYPE	SERIAL NO.	JET SIZE	DEPTH OUT	FTGE	HRS RUN	ACC HRS	FT/HR	WOB	RPM	SPM	DEV	PP	MUD WT/VIS
1	13 1/2			H25022	4-18s	2122	2122	24.5	24.5	86.6	14	142	102/102		814	9.9/47
2	8 3/4	HUGHES	Q506FX	7024161	6-18s	5545	3423	25	25	136.9	14	142	102/102	0.62	814	9.9/78
3	8 3/4	SMITH	MDSI16BPX	JD6842	6-18s	8830	3285	83	83	39.6	10	60	91/90	2.99	1800	9.75/47
4	8 3/4	SMITH	MDI613	JE3903	6-18s	9070	240	15	15	16.0	22	60	102/94	3.34	2520	9.7/52
5	8 3/4	SMITH	I613MSA	JD7147	6-18s	9580	510	12.5	12.5	40.8	22	60	102/94	1.32	2520	9.8/61
6	8 1/2	HTC	BHC406Z	13305		9070	150	8	8	18.8	7	56	110		1180	9.7/27
5RR	8 3/4	SMITH	I613MSA	JD7147	6-18s	9880	660	17	29.5	38.8	7	56	110	0	1180	9.7/27
7	8 3/4	SMITH	MIDI613	JE3905	6-18s	9997	947	71.5	71.5	13.2	16	26	82/80	1.95	2317	9.8/54
8	6	SMITH	MDi613MUBPX	JE6495	3/16 2/20	14988	4991	78.5	78.5	63.6	2.5	22	0/89	1.16	1689	9.5/28
9	6	HUGHES	D411ST	71338905		12197	37	17.5	17.5	2.1	32	50	0/78	0.81	1458	9.5/29
10	6	SMITH	MSI613MQBPX	JE5613	6-18s	19333	7136	129.5	129.5	55.1	22	75	0/110		2476	9.5/31

FORMATION TOPS

G3 Operating, LLC.

Muller 1-21-16H

SW SW Section 21 T158N R103W Williams County, North Dakota

FORMATION	Muller 1-21-16H		Muller 1-21-16H		Muller 1-21-16H	
	KB 2276'		KB 2276		KB	
	Sample Tops		**Prognosis**		**Elog tops**	
	TVD	SS	TVD	SS	TVD	SS
Base of Last Salt	8221	-5945	7620	-5344	8221	-5945
Ratcliffe	8289	-6013	8205	-5929	8289	-6013
Mission Canyon	8417	-6141	8390	-6114	8416	-6141
Lodgepole	9095	-6817	9080	-6804	9093	-6815
Upper Bakken	9600	-7322	9615	-7339	9598	-7320
Middle Bakken	9612	-7334	9625	-7349	9610	-7332
Middle Bakken Target	9628	-7352	9640	-7364	9628	-7352
Lower Bakken Shale	9653	-7375	9660	-7384	9651	-7373
Three Forks	9663	-7385	*	*	9661	-7383

DEVIATION RECORD

DEPTH	DEGREES		DEPTH	DEGREES
2265	0.88		7092	0.09
2357	1.14		7369	1.06
2452	1.23		7555	1.23
2544	1.49		7649	1.14
2635	1.85		7742	1.23
2727	1.49		7835	1.41
4305	0.35		8021	1.85
4583	0.62		8114	1.67
4769	0.09		8488	1.93
5049	0.44		8581	2.29
5234	0.79		8674	2.46
5326	0.7		8767	2.99
5510	0.62		8861	3.52
5604	0.62		8954	3.34
5881	0.35		9048	2.46
6067	0.35		9140	1.67
6252	0.26		9233	1.32
6438	0.18		9327	0.97
6624	0.44		9604	0.44
6811	0.7		9697	0.26
6998	0.62		9790	0.18
7278	0.88		9837	0.09
7462	1.41			

Tie-in Date: 05/26/2011
Date Completed: 06/01/2011

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
Rig:
PathFinder Office Supervisor:
PathFinder Field Engineers:

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:48.29.23.3808 N LON:104.0.36.5004 W
GRID Reference:NAD83 north dakota north Lambert
Ref GRID Coor: X: 1117595.8640 Y: 562849.1288
North Aligned To:TRUE NORTH
Total Magnetic Correction: 9.07°EAST TO TRUE
Vertical Section Plane: 0.26
Survey Vert. Reference: 16.00' Rotary Table To Ground
Altitude:2260.00' Ground To MSL

Survey Calculations by RX5 V6.03E using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
TIE IN SURVEY										
12078.00	90.66	1.42	9612.64	0.00	2756.38	2756.38 N	6.48 E	2756.39@	0.13	0.00
12148.00	89.60	0.81	9612.48	70.00	2826.37	2826.37 N	7.84 E	2826.38@	0.16	1.75
12183.00	88.46	3.44	9613.07	35.00	2861.35	2861.33 N	9.14 E	2861.35@	0.18	8.19
12277.00	90.75	6.96	9613.72	94.00	2954.97	2954.92 N	17.66 E	2954.98@	0.34	4.47
12372.00	91.36	6.79	9611.97	95.00	3049.32	3049.22 N	29.03 E	3049.36@	0.55	0.67
12466.00	91.19	4.50	9609.88	94.00	3142.88	3142.74 N	38.27 E	3142.97@	0.70	2.44
12560.00	91.54	2.74	9607.64	94.00	3236.69	3236.52 N	44.20 E	3236.82@	0.78	1.91
12655.00	90.75	0.98	9605.74	95.00	3331.63	3331.45 N	47.29 E	3331.78@	0.81	2.03
12750.00	91.10	359.49	9604.21	95.00	3426.61	3426.43 N	47.68 E	3426.76@	0.80	1.61
12844.00	91.63	359.93	9601.97	94.00	3520.58	3520.40 N	47.20 E	3520.72@	0.77	0.73
12939.00	91.28	359.93	9599.56	95.00	3615.55	3615.37 N	47.08 E	3615.68@	0.75	0.37
13034.00	90.66	359.14	9597.95	95.00	3710.53	3710.35 N	46.31 E	3710.64@	0.72	1.06
13129.00	91.63	359.31	9596.05	95.00	3805.49	3805.32 N	45.03 E	3805.59@	0.68	1.04
13223.00	91.89	359.23	9593.16	94.00	3899.43	3899.27 N	43.83 E	3899.52@	0.64	0.29
13317.00	90.75	358.61	9591.00	94.00	3993.38	3993.23 N	42.06 E	3993.45@	0.60	1.38
13412.00	90.84	359.40	9589.68	95.00	4088.35	4088.20 N	40.41 E	4088.40@	0.57	0.84
13506.00	90.84	0.02	9588.30	94.00	4182.33	4182.19 N	39.93 E	4182.38@	0.55	0.66
13600.00	91.19	359.75	9586.64	94.00	4276.31	4276.18 N	39.75 E	4276.36@	0.53	0.47
13695.00	90.57	359.67	9585.18	95.00	4371.30	4371.16 N	39.27 E	4371.34@	0.51	0.66
13789.00	90.75	359.23	9584.10	94.00	4465.28	4465.15 N	38.36 E	4465.32@	0.49	0.51
13884.00	90.92	359.05	9582.71	95.00	4560.25	4560.13 N	36.94 E	4560.28@	0.46	0.26
13979.00	90.84	359.84	9581.25	95.00	4655.23	4655.12 N	36.02 E	4655.26@	0.44	0.84
14074.00	90.04	359.49	9580.52	95.00	4750.22	4750.11 N	35.46 E	4750.24@	0.43	0.92
14168.00	90.84	358.96	9579.80	94.00	4844.20	4844.10 N	34.19 E	4844.22@	0.40	1.02

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
RIG:

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
14262.00	91.19	358.17	9578.14	94.00	4938.15	4938.05 N	31.84 E	4938.16@	0.37	0.92
14356.00	90.48	357.91	9576.77	94.00	5032.07	5031.99 N	28.62 E	5032.07@	0.33	0.81
14450.00	89.96	358.08	9576.41	94.00	5125.99	5125.93 N	25.33 E	5125.99@	0.28	0.58
14545.00	90.66	358.79	9575.89	95.00	5220.94	5220.89 N	22.74 E	5220.94@	0.25	1.05
14639.00	90.66	358.26	9574.81	94.00	5314.89	5314.85 N	20.32 E	5314.89@	0.22	0.56
14733.00	91.01	359.58	9573.44	94.00	5408.85	5408.82 N	18.55 E	5408.86@	0.20	1.45
14827.00	90.48	359.75	9572.22	94.00	5502.84	5502.81 N	18.00 E	5502.84@	0.19	0.59
14921.00	90.13	359.58	9571.72	94.00	5596.83	5596.81 N	17.45 E	5596.84@	0.18	0.41
15016.00	90.57	359.49	9571.14	95.00	5691.82	5691.81 N	16.68 E	5691.83@	0.17	0.47
15110.00	90.92	359.14	9569.91	94.00	5785.80	5785.79 N	15.55 E	5785.81@	0.15	0.53
15204.00	90.75	359.58	9568.54	94.00	5879.78	5879.78 N	14.50 E	5879.79@	0.14	0.50
15299.00	89.52	358.52	9568.32	95.00	5974.76	5974.76 N	12.93 E	5974.77@	0.12	1.71
15393.00	90.22	0.10	9568.53	94.00	6068.74	6068.75 N	11.80 E	6068.76@	0.11	1.84
15488.00	89.52	359.49	9568.75	95.00	6163.73	6163.75 N	11.46 E	6163.76@	0.11	0.98
15583.00	91.19	359.31	9568.16	95.00	6258.72	6258.74 N	10.46 E	6258.74@	0.10	1.77
15677.00	91.45	359.40	9565.99	94.00	6352.68	6352.71 N	9.40 E	6352.71@	0.08	0.29
15772.00	91.19	358.26	9563.81	95.00	6447.63	6447.66 N	7.47 E	6447.66@	0.07	1.23
15867.00	90.22	357.64	9562.64	95.00	6542.54	6542.59 N	4.07 E	6542.59@	0.04	1.21
15962.00	90.31	358.52	9562.20	95.00	6637.47	6637.53 N	0.88 E	6637.53@	0.01	0.93
16056.00	90.48	358.17	9561.55	94.00	6731.41	6731.49 N	1.83 W	6731.49@	359.98	0.41
16150.00	90.75	358.61	9560.54	94.00	6825.36	6825.45 N	4.47 W	6825.45@	359.96	0.55
16245.00	90.75	358.43	9559.30	95.00	6920.31	6920.41 N	6.92 W	6920.41@	359.94	0.19
16339.00	91.10	358.35	9557.78	94.00	7014.24	7014.36 N	9.57 W	7014.37@	359.92	0.38
16434.00	91.36	358.35	9555.74	95.00	7109.17	7109.30 N	12.30 W	7109.31@	359.90	0.27
16528.00	91.54	358.47	9553.36	94.00	7203.09	7203.23 N	14.91 W	7203.25@	359.88	0.23
16623.00	92.07	0.46	9550.37	95.00	7298.03	7298.18 N	15.79 W	7298.19@	359.88	2.17
16717.00	89.43	0.90	9549.14	94.00	7392.01	7392.15 N	14.68 W	7392.17@	359.89	2.85
16811.00	89.43	1.25	9550.07	94.00	7485.99	7486.13 N	12.92 W	7486.14@	359.90	0.37

PathFinder Energy Services, Inc.
Survey Report

G3 OPERATING, LLC
MULLER 1-21-16H ST1
WILLIAMS COUNTY, ND
RIG:

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
16906.00	89.52	0.90	9550.94	95.00	7580.98	7581.11 N	11.13 W	7581.12@	359.92	0.38
17000.00	89.96	2.22	9551.37	94.00	7674.95	7675.07 N	8.57 W	7675.08@	359.94	1.48
17095.00	90.40	3.88	9551.07	95.00	7769.84	7769.93 N	3.52 W	7769.94@	359.97	1.81
17190.00	90.48	3.53	9550.34	95.00	7864.66	7864.73 N	2.62 E	7864.73@	0.02	0.38
17284.00	91.01	2.48	9549.12	94.00	7958.54	7958.59 N	7.55 E	7958.60@	0.05	1.25
17379.00	91.36	2.22	9547.16	95.00	8053.46	8053.49 N	11.44 E	8053.50@	0.08	0.46
17473.00	91.80	2.22	9544.56	94.00	8147.37	8147.39 N	15.08 E	8147.40@	0.11	0.47
17568.00	91.10	2.04	9542.16	95.00	8242.29	8242.29 N	18.61 E	8242.31@	0.13	0.76
17662.00	90.92	0.90	9540.50	94.00	8336.25	8336.24 N	21.02 E	8336.27@	0.14	1.23
17757.00	90.22	1.34	9539.56	95.00	8431.24	8431.22 N	22.88 E	8431.25@	0.16	0.87
17852.00	90.31	0.63	9539.12	95.00	8526.23	8526.20 N	24.51 E	8526.24@	0.16	0.75
17947.00	90.31	1.16	9538.60	95.00	8621.22	8621.19 N	26.00 E	8621.23@	0.17	0.56
18042.00	90.48	1.34	9537.95	95.00	8716.20	8716.17 N	28.07 E	8716.21@	0.18	0.26
18137.00	90.22	0.55	9537.37	95.00	8811.19	8811.15 N	29.63 E	8811.20@	0.19	0.87
18231.00	90.92	0.63	9536.43	94.00	8905.19	8905.14 N	30.60 E	8905.19@	0.20	0.75
18326.00	91.36	0.55	9534.54	95.00	9000.17	9000.11 N	31.58 E	9000.17@	0.20	0.47
18421.00	91.01	0.28	9532.58	95.00	9095.14	9095.09 N	32.27 E	9095.15@	0.20	0.46
18515.00	90.40	359.67	9531.42	94.00	9189.14	9189.08 N	32.23 E	9189.14@	0.20	0.92
18610.00	90.31	1.16	9530.83	95.00	9284.13	9284.08 N	32.91 E	9284.14@	0.20	1.57
18704.00	91.10	1.60	9529.68	94.00	9378.10	9378.04 N	35.18 E	9378.11@	0.21	0.96
18799.00	91.28	1.25	9527.71	95.00	9473.06	9472.99 N	37.54 E	9473.07@	0.23	0.41
18893.00	91.10	0.46	9525.75	94.00	9567.04	9566.96 N	38.94 E	9567.04@	0.23	0.86
18987.00	91.63	359.84	9523.51	94.00	9661.01	9660.93 N	39.19 E	9661.01@	0.23	0.87
19082.00	91.71	0.10	9520.74	95.00	9755.97	9755.89 N	39.14 E	9755.97@	0.23	0.29
19176.00	91.45	0.19	9518.15	94.00	9849.93	9849.86 N	39.38 E	9849.93@	0.23	0.29
19271.00	90.84	0.19	9516.26	95.00	9944.91	9944.84 N	39.69 E	9944.91@	0.23	0.64
19288.00	90.66	359.67	9516.03	17.00	9961.91	9961.83 N	39.67 E	9961.91@	0.23	3.24
STRAIGHT LINE PROJECTION TO BIT										
19333.00	90.66	359.67	9515.51	45.00	10006.91	10006.83 N	39.41 E	10006.91@	0.23	0.00

G3 Operating, LLC
Muller 1-21-16H
SW SW Section 21 T158N R103W
Williams County, North Dakota
API: 33-105-02157

SAMPLE DESCRIPTIONS

Vertical, Coring, Curve, & Lateral
7,550' – 19,333' MD

Began logging at 7,890' MD in the Charles Formation.

8150 SHALE: Orange to rust red, off brown reddish, creamy orange, slight trace of creamy off white, greyish brown, silty, blocky in part, calcareous, firm to soft, gummy, pasty, slight trace of anhydrite, creamy off white, very soft, gummy, pasty, very slight trace of limestone, even fair yellow, green fluorescence, instant streaming to a fair milky yellow, green, white cut.

8150 – 8160 ANHYDRITE: Gray, light gray, cream brown, cream, rust, rust red, cream orange, brown, brown , gray , cream gray, cream, fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8160 – 8170 ANHYDRITE: Gray, light gray , cream brown, cream, rust, rust red, cream orange, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8170 – 8180 ANHYDRITE: Gray, light gray , cream brown, cream, rust, rust red, cream orange, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8180 – 8190 SALT: Gray, cream gray, cream tan, tan, cream brown, cream, hard to brittle, blocky, medium grained, angular, very slight effervescence, translucent, no fluorescence, faint green translucent milky cut.

8190 – 8200 SALT: Gray, cream gray, cream tan, tan, cream brown, cream, hard to brittle, blocky, medium grained, angular, very slight effervescence, translucent, no fluorescence, faint green translucent milky cut.

8200 – 8210 SALT: Gray, white, cream gray, cream tan, tan, cream brown, cream, hard to brittle, blocky, medium grained, angular, very slight effervescence, translucent, no fluorescence, faint green translucent milky cut.

Base of the Last Salt ***8,222' MD*** ***8,221' TVD*** ***-5,945' SS***

8210 – 8220 ANHYDRITE: Brown, light brown , cream brown, cream, rust, rust , cream, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8220 – 8230 ANHYDRITE: Light brown, brown , cream brown, cream, rust, rust , cream, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8230 – 8240 ANHYDRITE: Light brown, brown , cream brown, cream, rust, rust , cream, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8240 – 8250 ANHYDRITE: Brown, light brown , cream brown, cream, rust, rust , cream, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8250 – 8260 ANHYDRITE: Brown, light brown , cream brown, cream, rust, rust , cream, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8260 – 8270 ANHYDRITE: Brown, light brown , cream brown, cream, rust, rust , cream, brown, brown , gray , cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8270 – 8280 ANHYDRITE: Brown, light brown , cream brown, cream, rust, rust , cream, brown, brown, gray, cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

8280 – 8290 ANHYDRITE: Brown, light brown , cream brown, cream, rust, rust , cream, brown, brown, gray, cream gray, cream, very fine to fine grained, slight effervescence, soft to pasty, sub angular to angular, bright white fluorescence, fast milky white cut.

Ratcliffe ***8,290' MD*** ***8,289' TVD*** ***-6,013' SS***

8290 – 8300 LIMESTONE: Brown, dark brown, cream brown, cream, rust, cream, brown, brown, gray, cream gray, cream, pelloidal mudstone, argillaceous, anhydrite nodules, horizontal laminations, no visible porosity, spotted white fluorescence, fast milky cut.

8300 – 8310 LIMESTONE: Brown, dark brown, cream brown, cream, rust, cream, brown, brown, gray, cream gray, cream, pelloidal mudstone, argillaceous, anhydrite nodules, horizontal laminations, no visible porosity, spotted white fluorescence, fast milky cut.

8310 – 8320 LIMESTONE: Brown, dark brown , cream brown, cream, rust, cream, brown, brown, gray, cream gray, cream, pelloidal mudstone, argillaceous, anhydrite nodules, horizontal laminations, no visible porosity, white fluorescence, fast milky cut.

8320 – 8330 LIMESTONE: Brown, dark brown, cream brown, cream, brown, brown, gray, cream gray, cream, pelloidal mudstone, argillaceous, anhydrite nodules, horizontal laminations, no visible porosity, spotted white fluorescence, fast milky cut.

8330 – 8340 LIMESTONE: Brown, dark brown, cream brown, brown, gray, cream gray, cream, wackestone, cryptocrystalline, anhydrite nodules, horizontal laminations, intergranular porosity, bright white fluorescence, residual fast milky white/green cut.

8340 – 8350 LIMESTONE: Brown, dark brown, cream brown, brown, gray, cream gray, cream, wackestone, cryptocrystalline, anhydrite nodules, horizontal laminations, intergranular porosity, bright white fluorescence, residual fast milky white/green cut.

8350 – 8360 LIMESTONE: Brown, dark brown, cream brown, cream, brown, brown, gray, cream gray, cream, wackestone, cryptocrystalline, intergranular porosity, bright white fluorescence, residual fast milky white/green cut.

8360 – 8370 LIMESTONE: Brown, dark brown, cream brown, cream, brown, brown, gray, cream gray, cream, packstone, cryptocrystalline, anhydrite nodules, horizontal laminations, intergranular porosity, bright white fluorescence, residual fast milky white/green cut.

8370 – 8380 LIMESTONE: Brown, dark brown , cream brown, cream, rust , cream, brown, brown , gray , cream gray, cream, pelloidal packstone, poorly sorted coated grains, secondary, sucrosic, dolomitic cement, good fenestral/vuggy porosity, bright white fluorescence, fast milky white/green streaming cut, residual light stain after cut.

8380 – 8390 LIMESTONE: Brown, dark brown , cream brown, cream, rust , cream, brown, brown , gray , cream gray, cream, pelloidal packstone, poorly sorted coated grains, secondary, sucrosic, dolomitic cement, good fenestral/vuggy porosity, bright white fluorescence, fast milky white/green streaming cut, residual light stain after cut.

Midale ***8,390' MD*** ***8,389' TVD*** ***-6,114' SS***

8390 – 8400 DOLOMITE: Dark brown, gray brown, cream brown, cream, brown, brown, cream gray, cream, mudstone, silty stringers, no visible porosity, horizontal dark organic rich laminations, bright white fluorescence, burrows, fast milky white/green streaming cut, residual light stain after cut.

Mission Canyon ***8,417' MD*** ***8,416' TVD*** ***-6,141' SS***

8400 – 8430 DOLOMITE: Dark brown, cream, brown, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, fossil shell remains, possibly gastropod, horizontal dark organic rich laminations, bright white fluorescence, burrows, fast milky white/green streaming cut, residual light stain after cut.

8430 – 8460 DOLOMITE: Dark brown, cream, brown, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, fossil shell remains, possibly gastropod, horizontal dark organic rich laminations, bright white fluorescence, fast milky white/green streaming cut, residual light stain after cut.

8460 – 8490 DOLOMITE: Dark brown, cream, brown, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light stain after cut.

8490-8520 DOLOMITE: Dark brown, cream, brown, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light stain after cut.

8520 – 8550 DOLOMITE: Dark brown, cream, brown, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light stain after cut.

8550 – 8580 DOLOMITE: Dark brown, light brown, cream, sub rounded to sub angular microcrystalling grains, poorly sorted, calcitic and dolomitic cement, oil soaked sample, oil beads on cutting surfaces, oil stained , cherty in part, overall bright yellow fluorescence, brilliant white instant cut with numerous white and green streamers, residual light stain after cut.

8580 – 8610 DOLOMITE: Light brown, cream, pink, sub rounded to sub angular microcrystalling grains, poorly sorted, calcitic and dolomitic cement, oil soaked sample, oil beads on cutting surfaces, oil stained , cherty in part, anhydrite stringers, secondary porosity due to dissolution fissures, overall bright yellow fluorescence, brilliant white instant cut with numerous white and green streamers, residual light stain after cut.

8610 – 8640	DOLOMITE: Light brown, cream, brown, sub rounded to sub angular microcrystalling grains, poorly sorted, calcitic and dolomitic cement, oil soaked sample, oil beads on cutting surfaces, oil stained , cherty in part, anhydrite stringers, secondary porosity due to dissolution fissures, overall bright yellow fluorescence, brilliant white instant cut with numerous white and green streamers, residual light brown stain after cut.
8640 – 8670	DOLOMITE: Light brown, cream, brown, white, sub rounded to sub angular microcrystalling grains, poorly sorted, calcitic and dolomitic cement, oil soaked sample, oil beads on cutting surfaces, oil stained , cherty in part, anhydrite stringers, secondary porosity due to dissolution fissures, overall bright yellow fluorescence, brilliant white instant cut with numerous white and green streamers, residual light brown stain after cut.
8670 – 8700	DOLOMITE: Brown, cream, light brown, white, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
8700 – 8730	DOLOMITE: Brown, cream, light brown, white, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
8730 – 8760	DOLOMITE: Dark brown, cream, brown, white, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
8760 – 8790	DOLOMITE: Brown, cream, light brown, white, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, light brown and dark brown oil stain, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
8790 – 8820	DOLOMITE: Brown, cream, light brown, white, packstone, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, light brown and dark brown oil stain, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
8820 – 8850	DOLOMITE: Brown, cream, light brown, white, sub rounded to sub angular microcrystalline grains, poorly sorted, calcitic and dolomitic cement, silty matrix, anhydrite nodules, light brown and dark brown oil stain, cherty, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
8850 – 8880	DOLOMITE: Dark brown, cream, brown, white, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut
8880 – 8910	DOLOMITE: Dark brown, cream, brown, white, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut

8910 – 8940	DOLOMITE: Dark brown, cream, brown, white, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut
8940 – 8970	DOLOMITE: Dark brown, cream, brown, pink, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut
8970 – 9000	DOLOMITE: Dark brown, cream, brown, pink, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut
9000 – 9030	DOLOMITE: Dark brown, cream, brown, white, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
9030 – 9060	DOLOMITE: Dark brown, cream, brown, white, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.
9060 – 9090	DOLOMITE: Dark brown, cream, brown, white, sub rounded to sub angular microcrystalline grains poorly sorted, and partly cryptocrystalline and massive, calcitic and dolomitic cement where granular and silty matrix, platy, numerous very small horizontal dark brown laminations, platy and fissile texture in some cuttings contributing to secondary porosity and light brown and dark brown oil stains, bright white fluorescence, fast milky white/green streaming cut, residual light brown stain after cut.

Lodgepole ***9,095' MD*** ***9,093' TVD*** ***-6,817' SS***

9090 – 9120	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9120 – 9150	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9150 – 9180	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut

9180 – 9210	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9210 – 9240	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9240 – 9270	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut.
9270 – 9300	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9300 – 9330	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9330 – 9360	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9360 – 9390	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9390 – 9420	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9420 – 9450	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9450 – 9480	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9480 – 9510	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut.
9510 – 9540	LIMESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut
9540 – 9580	LIMESTONE; Gray, light gray, dark brown, microcrystalline grains, massive, argillaceous, dolomitic, oolitic and pelloidal, thin horizontal laminations in part, spotty yellow fluorescence, light milky cut

Coring Samples

9580 – 9600	LI MESTONE; Gray, brown, light gray, light brown, microcrystalline grains, argillaceous, dolomitic, platy in part, oil staining, blotchy green fluorescence, fast bright white milky with some streaming cut residual light brown stain after cut.

Upper Bakken Shale	***9,600' MD***	***9,598' TVD***	***-7,322' SS***
Middle Bakken Shale	***9,612' MD***	***9,610' TVD***	***-7,334' SS***

9600 – 9630 LI MESTONE; Gray, light gray, light brown, microcrystalline grains, argillaceous, dolomitic, very soft, platy in part, pyritic, laminations in party, oil staining in the rock, blotchy green fluorescence, fast white cloudy with some streaming cut residual light brown stain after cut.

Lower Bakken Shale	***9,653' MD***	***9,651' TVD***	***-7,375' SS***

9650 spot spl LI MESTONE; Gray, light gray, light brown, microcrystalline grains, argillaceous, dolomitic, very soft, platy in part, pyritic, laminations in party, oil staining in the rock, blotchy green fluorescence, fast white cloudy with some streaming cut residual light brown stain after cut.

Depth changed from 9,670' to 9,660'

Three Forks	***9,663' MD***	***9,661' TVD***	***-7,385' SS***

9680 spot spl LIMESTONE: Grayish brown, olive gray, microcrystalline, massive, dolomitic, white/cream anhydrite and red shale stringers black, firm blocky shale stringers, spotty green fluorescence, instant milky white cut.

9680 - 9690 LIMESTONE: Grayish brown, olive gray, microcrystalline, massive, dolomitic, white/cream anhydrite stringers, spotty green fluorescence, instant milky white cut.

9690 - 9720 LIMESTONE: Grayish brown, olive gray, microcrystalline, massive, dolomitic, white/cream anhydrite stringers, spotty green fluorescence, instant milky white cut.

9720 – 9750 LIMESTONE: Grayish brown, olive gray, microcrystalline, massive, dolomitic, white/cream anhydrite stringers, spotty green fluorescence, instant milky white cut.

9750 – 9780 SHALE: Orange, reddish, light gray, olive gray, dolomitic, massive, white/cream anhydrite stringers, platy in part very soft, spotty green fluorescence, instant cloudy white cut.

9780 – 9810 SHALE: Orange, reddish, light gray, olive gray, dolomitic, massive, white/cream anhydrite stringers, platy in part very soft, spotty green fluorescence, instant cloudy white cut.

9810 – 9840 DOLMITE: Light brown, olive gray, orange, microcrystalline, moderately hard, calcareous, white/cream anhydrite stringers, little to no porosity, spotty green fluorescence, instant cloudy white cut.

9840 – 9880 DOLMITE: Light brown, olive gray, orange, microcrystalline, moderately hard, calcareous, white/cream anhydrite stringers, little to no porosity, spotty green fluorescence, instant cloudy white cut.

CURVE

9060 CEMENT: From plug

9060 - 9080 LIMESTONE: Gray, cream mottled, poorly sorted, very angular, dolomitic, red dolomite stringer, silty, 10% cement, well indurated, pelloidal, oolitic, horizontal wavy laminations, good interparticle porosity, overall green fluorescence, dead stain, fast milky white cut, slow yellow bleeding cut

9090 - 9110	CEMENT: From plug
9110 – 9140	CEMENT: From plug
9140 – 9170	LI MESTONE; Gray, light gray, dark gray, dark brown, microcrystalline grains, massive, argillaceous, hard, oolitic and pelloidal, horizontal laminations in part, dolomitic red , orange, agillaceous,spotty yellow fluorescence, fast milky cut residual light brown stain after cut.
9170 – 9200	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, argillaceous, dolomitic, oolitic and pelloidal, laminations in part, spotty yellow fluorescence, fast milky cut residual light brown stain after cut.
9200 – 9230	LI MESTONE; Gray, light gray, dark gray, dark brown, microcrystalline grains, massive, argillaceous, hard, oolitic and pelloidal, horizontal laminations in part, dolomitic red , orange, agillaceous,spotty yellow fluorescence, fast milky cut residual light brown stain after cut.
9230 – 9260	LI MESTONE; Gray, light gray, dark gray, dark brown, microcrystalline grains, massive, argillaceous, hard, oolitic and pelloidal, horizontal laminations in part, dolomitic red , orange, white, tan, agillaceous,spotty yellow fluorescence, fast milky cut residual light brown stain after cut.
9260 – 9290	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, argillaceous, dolomitic, hard to very hard, oolitic and pelloidal, horizontal laminations in part, spotty yellow fluorescence, fast milky cut residual light brown stain after cut.
9290 – 9320	LI MESTONE; Gray, light gray, dark brown, microcrystalline grains, argillaceous, hard to very hard, oolitic and pelloidal, laminations in part, dolomitic, red, light brown, tan, spotty yellow fluorescence, fast cloudy cut residual light brown stain after cut.
9320 – 9350	LI MESTONE; Dark gray, gray, light gray, microcrystalline grains, argillaceous, hard to very hard, oolitic and pelloidal, laminations in part, dolomitic, red, orange, spotty yellow/ green fluorescence, cloudy white streaming cut.
9350 – 9380	LIMESTONE: Dark gray, poorly sorted, very angular, mudstone, well indurated, dolomitic, argillaceous, oolitic, skeletal fragments, good interparticle porosity, patchy green fluorescence, dead stain, fast fluorescent white cut
9380 – 9410	LIMESTONE: Dark gray, poorly sorted, very angular, mudstone, well indurated, dolomitic, argillaceous, oolitic, pelloidal, light brown, spotty oil stain with yellow fluorescence, fast streaming fluorescent white cut, residual brown stain
9410 – 9440	LIMESTONE: Light gray, brown, poorly sorted, very angular, mudstone, well indurated, horizontal laminations, carbonaceous, dolomitic, oolitic, pelloidal, spotty green fluorescence, fast streaming milky white cut
9440 – 9470	LIMESTONE: Gray, brown, poorly sorted, very angular, mudstone, well indurated, horizontal laminations, dolomitic, red/orange dolomite stringer, argillaceous, carbonaceous, oolitic, spotty yellow fluorescence, fast milky white cut
9470 – 9500	LIMESTONE: Dark Gray, poorly sorted, very angular, mudstone, well indurated, dolomitic, red/orange dolomite stringer, argillaceous, oolitic, pelloidal, spotty yellow fluorescence, fast milky white cut

9530 – 9530	LIMESTONE: Dark Gray, poorly sorted, very angular, mudstone, well indurated, dolomitic, red/orange dolomite stringer, argillaceous, oolitic, spotty yellow fluorescence, fast milky white cut
9530 – 9560	LIMESTONE: Gray, brown, poorly sorted, very angular, mudstone, well indurated, horizontal laminations, dolomitic, red/orange dolomite stringer, argillaceous, spotty green fluorescence, fast fluorescent white cut.
9560 – 9590	LIMESTONE: Gray, brown, poorly sorted, very angular, mudstone, well indurated, horizontal laminations, dolomitic, red/orange dolomite stringer, argillaceous, spotty green fluorescence, fast fluorescent white cut, bright white streamer.
9590 – 9620	LIMESTONE: Gray, dark gray, poorly sorted, very angular, mudstone, well indurated, horizontal laminations, dolomitic, red/orange dolomite stringer, argillaceous, spotty green fluorescence, fast cloudy white/green cut residual light brown stain after cut.
9620 – 9650	LIMESTONE: Gray, dark gray, brown, poorly sorted, very angular, well indurated, horizontal laminations, dolomitic, red/orange dolomite stringer, argillaceous, spotty green fluorescence, fast cloudy white/green cut residual light brown stain after cut.
9650 – 9680	LIMESTONE: Gray, dark gray, poorly sorted, very angular, mudstone, well indurated, horizontal laminations, carbonaceous, dolomitic, red/orange dolomite stringer, argillaceous, spotty green fluorescence, fast cloudy white/green cut residual light brown stain after cut.
9680 – 9710	LIMESTONE: Light gray, gray, dark gray, poorly sorted, very angular, well indurated, horizontal laminations, dolomitic, red/orange dolomite stringer, argillaceous, spotty green fluorescence, fast cloudy white/green cut residual light brown stain after cut.
9710 – 9740	LIMESTONE: Gray, poorly sorted, very angular, mudstone, well indurated, sub-horizontal laminations, dolomitic, red dolomite stringer, argillaceous, carbonaceous, pelloidal, overall patchy green fluorescence, fast milky white cut

False Bakken	***9,766' MD***	***9,764' TVD***	***-7,488' SS***

9740 – 9770	LIMESTONE: Gray, cream, mottled, poorly sorted, very angular, mudstone, well indurated, sub-horizontal laminations, dolomitic, red dolomite stringer, carbonaceous, overall patchy green fluorescence, fast milky white cut

Upper Bakken Shale	***9,790' MD***	***9,598' TVD***	***-7,322' SS***

9770 – 9800	SHALE: (Transition zone to Upper Bakken) Black, blocky, gritty, very well indurated, silty lithic calcareous laminations, carbonaceous, red dolomite stringer, uneven patchy green fluorescence, fast fluorescent white cut, brown residual stain after cut
9800 – 9830	SHALE: Black, blocky, gritty, very well indurated, silty lithic calcareous laminations, less carbonaceous than previous sample, red dolomite stringer, uneven patchy green fluorescence, fast fluorescent white cut, brown residual stain after cut

Middle Bakken	***9,831' MD***	***9,610' TVD***	***-7,334' SS***

9830 – 9860	SHALE: (Transition zone to middle bakken) Dark gray and black, waxy, vuggy, gritty, soft to moderately hard, silty, carbonaceous, red dolomite stringer, patchy brown oil staining, uneven patchy green fluorescence, fast fluorescent white cut, white streamers, brown residual stain after cut

9860 – 9890	SILTSTONE: Gray, lithic, subangular grains, microsucrosic, wavy horizontal laminations, poorly indurated, carbonaceous, calcareous, dolomitic in part, red dolomite stringers, spotty medium brown and dead oil stains, uneven spotty green fluorescence, fast fluorescent white cut, slow white streamers.
9890 – 9920	SILTSTONE: Gray, light gray, lithic, subangular grains, microsucrosic, wavy horizontal laminations, poorly indurated, carbonaceous, calcareous, dolomitic in part, red/orange dolomite stringers, spotty brown oil stains, uneven spotty green fluorescence, fast cloudy white cut, slow white streamers.
9920 – 9950	SILTSTONE: Gray, light gray, lithic, subangular grains, microsucrosic, wavy horizontal laminations, poorly indurated, carbonaceous, calcareous, dolomitic in part, red/orange dolomite stringers, spotty brown oil stains, uneven spotty green fluorescence, fast cloudy white cut, slow white streamers.
9950 – 9980	SILTSTONE: Gray, light gray, lithic, subangular grains, microsucrosic, wavy horizontal laminations, poorly indurated, carbonaceous, calcareous, dolomitic in part, red/orange dolomite stringers, spotty brown oil stains, uneven spotty green fluorescence, fast cloudy white cut, slow white streamers.

End of Curve ***9,997' MD*** ***9,620.36' TVD***

Lateral

9980 – 10010	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut
10010 – 10040	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut
10040 – 10070	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut
10070 – 10100	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut
10100 – 10130	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut
10130 – 10160	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut

10160 – 10190	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut
10190 – 10220	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, fast milky white cut, slow yellow bleeding cut
10220 – 10250	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, uneven spotty green fluorescence, fast milky white cut, white streamers after cut.
10250 – 10280	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, slow dull white cut, white streamers after cut.
10280 – 10310	SILTSTONE: Gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, slow white cut, white streamers after cut.
10310 – 10340	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, even spotty green fluorescence, very slow white cut
10340 – 10370	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic in part, , even spotty green fluorescence, very slow white cut
10370 – 10400	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, , uneven spotty green fluorescence, fast white cut, white streamers.
10400 – 10430	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, spotty green fluorescence, fast white cloudy cut, white streamers.
10430 – 10460	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, , spotty green fluorescence, fast fluorescent white cut, white streamers.
10460 – 10490	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, uneven spotty brown and dead oil stains, uneven spotty green fluorescence, fast cloudy white cut.
10490 – 10520	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, uneven spotty green fluorescence, very slow cloudy cut.

10520 – 10550 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, , uneven dull spotty green fluorescence, fast fluorescent white cut.

10550 – 10580 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, and dolomitic in part, uneven bright spotty yellow fluorescence, no cut.

10580 – 10610 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, spotted brown oil stains, uneven spotty green fluorescence, slow weak white cloudy cut white stringers.

10610 – 10640 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, uneven spotty brown oil stains, uneven spotty green fluorescence, no cut.

10640 – 10670 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, spotty brown oil stains, very dull spotty green fluorescence, no cut.

10670 – 10700 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, very dulls potty green fluorescence, no cut.

10700 – 10730 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, shale stringers, , uneven spotty green fluorescence, strong white/green milky cut.

10730 – 10760 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, very argillaceous, pyritic, very calcareous, shale stringers, uneven spotty green fluorescence, fast white/green cloudy cut.

10760 – 10790 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, very argillaceous, pyritic, very calcareous, , uneven spotty green fluorescence, fast milky white cut, white streamers

10790 – 10820 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, very argillaceous, pyritic, very calcareous, trace pisolites (spherical, rounded, hardness > 5.5), even bright yellow spotty fluorescence, no cut

10820 – 10850 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, uneven spotty green fluorescence, fast white/green cloudy cut.

10850 – 10880 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic, even spotty green fluorescence, pale milky cut.

10880 – 10910 SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic, shale stringers, light brown oil saturated, even spotty green fluorescence, no cut.

10910 – 10940	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic,shale stringers, light brown oil saturated, even spotty green fluorescence, no cut
10940 – 10980	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, very argillaceous, very calcareous, dolomitic,shale stringers, light brown oil saturated, bright even spotty green fluorescence, milky white cut, white stringers
10980 – 11010	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, pyritic, very calcareous, dolomitic, shale stringers, bright even spotty green fluorescence, fast fluorescent white cut, white stringers
11010 – 11040	SILTSTONE: Gray, cream mottled, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amounts of free oil, dull uneven spotty green fluorescence, slow milky white cut
11040 – 11070	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, very argillaceous, very calcareous, dolomitic, shale stringers, brown oil saturated, uneven spotty green fluorescence better than previous sample, no cut
11070 – 11100	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, brown oil saturated, even spotty green fluorescence, trace white cut
11100 – 11130	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, trace pisolites (spherical, rounded, hardness > 5.5), dolomitic, shale stringers, trace amounts of brown oil, even spotty green fluorescence, no cut
11130 – 11160	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, trace uneven brown oil staining, even dull spotty green fluorescence, no cut
11160 – 11190	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright, even spotty green fluorescence, no cut
11190 – 11220	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, trace uneven brown oil stains, bright, even spotty green fluorescence, no cut
11220 – 11250	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright, even spotty green fluorescence, trace white cut
11250 – 11280	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, shale stringers, trace uneven brown oil stains, bright, even spotty green fluorescence, no cut

11280 – 11310 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, quartzic, very argillaceous, very calcareous, shale stringers, bright, even spotty green fluorescence, trace white cut

11310 – 11340 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, quartzic, argillaceous, very calcareous, oolitic, shale stringers, trace uneven brown oil stains, bright, even spotty green fluorescence, no cut

11340 – 11370 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, oolitic, shale stringers, even spotty green fluorescence, slow trace white cut

11370 – 11400 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, calcareous, shale stringers, dull evenly spotted green fluorescence, no cut

11400 – 11430 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, shale stringers, bright yellow spotty fluorescence, no cut

11430 – 11460 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, trace amounts of pyrite, argillaceous, calcareous, dolomitic, shale stringers, evenly spotted green fluorescence, no cut.

11460 – 11490 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, trace amounts of pyrite, argillaceous, calcareous, dolomitic, shale stringers, minor amount of free oil , evenly spotted green fluorescence, no cut.

11490 – 11520 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, trace amounts of pyrite, argillaceous, calcareous, dolomitic, shale stringers, evenly spotted green fluorescence, no cut.

11520 – 11550 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, even spotty green fluorescence, no cut.

11550 – 11580 SILTSTONE: Light gray, white , gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, dull even spotty green fluorescence, no cut.

11580 – 11610 SILTSTONE: Light Gray, gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, dull even spotty green fluorescence, no cut.

11610 – 11640 SILTSTONE: Gray, dark gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, dull even spotty green fluorescence, no cut.

11640 – 11670 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, shale stringers, minor amount of free oil, evenly spotted green fluorescence, no cut.

11670 – 11700 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, shale stringers, minor amount of free oil, evenly spotted green fluorescence, no cut.

11700 – 11730 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, shale stringers, evenly spotted green fluorescence, no cut.

11730 – 11760 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, shale stringers, evenly spotted green fluorescence, no cut.

11760 – 11790 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amount of free oil, even dull spotty green fluorescence, very faint cut.

11790 – 11820 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amount of free oil, even dull spotty green fluorescence, very faint cut.

11820 – 11850 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, minor amount of free oil, argillaceous, very calcareous, dolomitic, shale stringers, bright pinpoint green fluorescence, no cut.

11850 – 11880 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright pinpoint green fluorescence, no cut.

11880 – 11910 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amount of free oil, bright pinpoint green fluorescence, very faint cut.

11910 – 11940 SILTSTONE: Gray, light gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, minor amount of free oil, bright pinpoint green fluorescence, no cut

11940 – 11970 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amount of free oil, bright pinpoint green fluorescence, very faint cut.

11970 – 12000 SILTSTONE: Gray, light gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, minor amount of free oil, bright pinpoint green fluorescence, no cut.

12000 – 12030 SILTSTONE: Gray, light gray, lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, minor amount of free oil, bright pinpoint green fluorescence, no cut

12030 – 12060 SILTSTONE: Gray, light gray,lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, minor amount of free oil, shale stringer, bright pinpoint green fluorescence, faint cut.

12060 – 12090 SILTSTONE: Gray, light gray,lithic, subangular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic in part, shale stringers, minor amount of free oil, bright pinpoint green fluorescence, faint cut

12090 – 12120 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright pinpoint green fluorescence, very faint cut.

12120 – 12150 SILTSTONE: Gray, light gray, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright pinpoint green fluorescence, very faint cut.

12150 – 12180 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright pinpoint spotty green fluorescence, no cut

12180 – 12210 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, quartzic argillaceous, very calcareous, dolomitic, shale stringers, bright pinpoint green fluorescence, no cut

12210 – 12240 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright pinpoint green fluorescence, faint cut

12240 – 12270 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers (black and buff), bright, bright pinpoint green fluorescence, no cut

12270 – 12300 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers (black and buff), bright, bright pinpoint green fluorescence, no cut

12300 – 12330 SILTSTONE: Brown, lithic ,subangular to angular grains, very poorly sorted, wavy horizontal laminations, moderately indurated, quartzic, sandy, argillaceous, calcareous, dolomitic, red shale stringers, brown globules of free oil, uneven bright green patchy fluorescence, fast fluorescent white cut

12330 – 12360 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately indurated, sandy, argillaceous, calcareous, dolomitic, mud matrix, brown globules of free oil, uneven bright green patchy fluorescence, fast fluorescent white cut

12360 – 12390 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately indurated, sandy, argillaceous, calcareous, dolomitic, mud matrix, brown globules of free oil, uneven bright green patchy fluorescence, fast fluorescent white cut, green bleeding cut

12390 – 12420 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, poorly to moderately indurated, argillaceous, very calcareous, mud matrix, uneven brighter green patchy fluorescence than previous sample, fast fluorescent white cut

12420 – 12450 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, poorly to moderately indurated, argillaceous, very calcareous, mud matrix, uneven bright green patchy fluorescence, fast fluorescent white cut, white streamers

12450 – 12480 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, poorly to moderately indurated, argillaceous, carbonaceous, very calcareous, dolomitic, shale stringers, mud matrix, bright green even pinpoint fluorescence, fast fluorescent white cut, white

12480 – 12510 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amounts of brown oil staining, bright green, even pinpoint fluorescence, fast milky white cut

12510 – 12540 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, wavy horizontal laminations, moderately indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright green, even pinpoint fluorescence, fast fluorescent white cut

12540 – 12570 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red and black shale stringers, minor amounts of brown free oil, bright green even pinpoint fluorescence, fast milky white cut

12570 – 12600 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amounts of mud cement, minor brown oil staining, bright green even pinpoint fluorescence, fast fluorescent white cut

12600 – 12630 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amounts of mud cement, trace amounts of oil saturation, bright green even pinpoint fluorescence, slow milky white cut, yellow bleeding cut

12630 – 12660 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, patchy brown oil staining, brighter green even pinpoint fluorescence than previous sample, fast milky white cut

12660 – 12690 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, oolitic, minor amounts of mud cement, bright green even pinpoint fluorescence, fast milky white cut, white stringers

12690 – 12720 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, muddy cement, brown oil saturation, bright green even pinpoint fluorescence, fast milky white cut

12720 – 12750 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red and black shale stringers, muddy cement, trace amounts of brown oil saturation, bright green even pinpoint fluorescence, slow milky white cut, white stringers

12750 – 12780 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, trace amounts of brown oil saturation, bright green even pinpoint fluorescence, faint white cut

12780 – 12810 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, trace amounts of brown oil saturation, bright green even pinpoint fluorescence, slow milky white cut

12810 – 12840 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, shale stringers, muddy cement, spotty brown oil staining, bright green even pinpoint fluorescence, faint white cut

12840 – 12870 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately indurated, argillaceous, calcareous, dolomitic, red and black shale stringers, muddy cement, spotty brown oil staining, bright green even pinpoint fluorescence, fast fluorescent white cut with multiple areas of circular bleeding cuts

12870 – 12900 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately indurated, argillaceous, calcareous, shale stringers, muddy cement, brown oil saturation, bright green even pinpoint fluorescence, milky white cut

12900 – 12930 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately indurated, argillaceous, calcareous, dolomitic, shale stringers, muddy cement, brown oil saturation, bright green even pinpoint fluorescence, , fast fluorescent white cut with multiple areas of circular bleeding cuts

12930 – 12960 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately indurated, argillaceous, calcareous, red and black shale stringers, muddy cement, bright green even pinpoint fluorescence, no cut

12960 – 12990 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, red and black shale stringers, muddy cement, bright green even pinpoint fluorescence, fast milky white cut

12990 – 13020 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, shale stringers, bright green even pinpoint fluorescence, no cut

13020 – 13050 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, shale stringers, bright green even pinpoint fluorescence, no cut.

13050 – 13080 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately indurated, argillaceous, calcareous, dolomitic, shale stringers, muddy cement, brown oil saturation, bright green even pinpoint fluorescence, fast fluorescent white cut with multiple areas of circular bleeding cuts

13080 – 13110 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately indurated, argillaceous, calcareous, dolomitic, shale stringers, muddy cement, brown oil saturation, bright green even pinpoint fluorescence, , fast fluorescent white cut with multiple areas of circular bleeding cuts

13110 – 13140 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, shale stringers, spotted brown free oil, bright green even pinpoint fluorescence, no cut.

13140 – 13170 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately indurated, argillaceous, calcareous, dolomitic, shale stringers, red dolomite stringers, brown free oil spotted, bright green even pinpoint fluorescence, fast fluorescent white cut

13170 – 13200 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, red dolomite stringers, bright green even pinpoint fluorescence, fast fluorescent white cut

13200 – 13230 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright green even pinpoint fluorescence, no cut.

13230 – 13260 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, bright green even pinpoint fluorescence, no cut.

13260 – 13290 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, red dolomite stringer, bright green even pinpoint fluorescence, slow weak cloudy slow green streamers.

13290 – 13320 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, green even pinpoint fluorescence, slow weak cloudy cut.

13320 – 13350 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, minor amount of free oil green, bright all over purple fluorescence, fast fluorescent white cut

13350 – 13380 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, minor amount of free oil, shale stringers, green even pinpoint fluorescence, slow weak cut.

13380 – 13410 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, red dolomite stringer, brighter green even pinpoint fluorescence, fast milky white cut.

13410 – 13440 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringer, minor amount of free oil, brighter green even pinpoint fluorescence, fast milky white cut.

13440 – 13470 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, green even pinpoint fluorescence, slow weak cut.

13470 – 13500 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, green even pinpoint fluorescence, slow weak cut.

13500 – 13530 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, red dolomite stringers, minor amount of free oil, green even pinpoint fluorescence, slow weak cut.

13530 – 13560 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, minor amount of free oil, shale stringers, green fluorescence, slow weak cut.

13560 – 13590 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, red dolomite stringers, minor amount of free oil, shale stringers, green fluorescence, fast green milky cut.

13590 – 13620 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, minor amount of free oil, shale stringers, green fluorescence, fast green milky cut, white stringers

13620 – 13650 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, minor amount of free oil, shale stringers, bright green even pinpoint fluorescence, fast green milky cut.

13650 – 13680 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringers, minor amount of free oil, shale stringers, bright green even pinpoint fluorescence, fast cloudy cut.

13680 – 13710 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, shale stringers, bright green even pinpoint fluorescence, fast cloudy cut.

13710 – 13740 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright green even pinpoint fluorescence, fast fluorescent white cut.

13740 – 13770 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright green even pinpoint fluorescence, fast white cloudy cut.

13770 – 13800 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright green even pinpoint fluorescence, fast white cloudy cut.

13800 – 13830 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, minor green uneven pinpoint fluorescence, slow milky white cut, yellow stringers

13830 – 13860	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, no cut
13860 – 13890	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, no cut
13890 – 13920	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, trace amounts of red dolomite stringer, no fluorescence, no cut
13920 – 13950	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, possible quartz grains, argillaceous, calcareous, dolomitic, very trace amounts of brown oil saturation, very minimal green pinpoint fluorescence, no cut
13950 – 13980	SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, no cut
13980 – 14010	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, no cut
14010 – 14040	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, faint cut
14040 – 14070	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, milky white cut
14070 – 14100	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, no fluorescence, no cut
14100 – 14130	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, slow milky white cut
14130 – 14160	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, no fluorescence, no cut
14160 – 14190	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor even green pinpoint fluorescence, fast milky white cut
14190 – 14220	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor even green pinpoint fluorescence, faint cut
14220 – 14250	SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor even green pinpoint fluorescence, faint cut

14250 – 14280 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, argillaceous, calcareous, dolomitic, minor even green pinpoint fluorescence, no cut

14280 – 14310 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor occurrences of red dolomite stringer, no fluorescence, no cut

14310 – 14340 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor occurrences of red dolomite stringer, minor even green pinpoint fluorescence, no cut

14340 – 14370 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, no fluorescence, no cut

14370 – 14400 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor occurrences of red dolomite stringer, no fluorescence, no cut

14400 – 14430 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, patchy brown oil staining, minor even green pinpoint fluorescence, no cut

14430 – 14460 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, brown oil saturation, minor even green pinpoint fluorescence, no cut

14460 – 14490 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, argillaceous, very calcareous, brown oil saturation, minor even green pinpoint fluorescence, trace cut.

14490 – 14520 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, minor brown oil saturation, minor even green pinpoint fluorescence, trace cut.

14520 – 14550 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, minor amounts of brown oil saturation, no fluorescence, trace cut.

14550 – 14580 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in approx. 30% of sample, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, minor traces of red dolomite stringer, brown oil saturation, no fluorescence, no cut

14580 – 14610 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor traces of red dolomite stringer, minor even green pinpoint fluorescence, no cut.

14610 – 14640 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor traces of red dolomite stringer, dull fluorescence, no cut.

14640 – 14670 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, dull fluorescence, slow cloudy cut.

14670 – 14700 SILTSTONE: Gray, cream mottled, lithic, subangular to angular grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, minor amount of free oil, dull fluorescence, white cloudy cut.

14700 – 14730 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, minor amount of free oil, dull fluorescence, slow cloudy cut.

14730 – 14760 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, minor traces of red dolomite stringer, minor amount of free oil, dull fluorescence, slow cloudy cut.

14760 – 14790 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringers, minor amount of free oil, dull fluorescence, no cut.

14790 – 14820 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, no fluorescence, trace cut

14820 – 14850 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, argillaceous, calcareous, dolomitic, minor amount of free oil, no fluorescence, trace cut

14850 – 14880 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, argillaceous, pyritic, very calcareous, minor amount of free oil, even green pinpoint fluorescence, no cut

14880 – 14910 SILTSTONE: Gray, cream mottled, lithic, subangular to angular very fine grains, interbedded buff siltstone stringers with subrounded to rounded grains/microsucrosic, limestone cement matrix, poorly sorted overall, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, black shale stringers, minor amount of free oil, no fluorescence, no cut

14910 – 14940	SHALE: Black, blocky, smooth, moderately indurated, silty, and slightly calcareous, no fluorescence, fast fluorescent white cut with white stringers
14940 – 14988	SHALE: Black, blocky, gritty, moderately indurated, lithic, silty, slightly calcareous, no fluorescence, fast fluorescent white cut with white stringers

SIDETRACK # 1

12190	SILTSTONE: Light gray, black, poorly sorted, moderately indurated, argillaceous (approximately 60% silt, 40% shale), blocky shale and very fine grained angular siltstone, extremely calcareous, all over uneven green pinpoint fluorescence, fast fluorescent white cut with white streamers.
BU – 12197	SILTSTONE: Light gray, black, poorly sorted, moderately indurated, argillaceous (approximately 60% silt, 40% shale), blocky shale and very fine grained angular siltstone, extremely calcareous, carbonaceous, traces of red dolomite stringer, minor amount of brown oil saturation, all over uneven green pinpoint fluorescence, fast fluorescent white cut .
12197 – 12220	SILTSTONE: Gray, light gray, cream, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, dull fluorescence, sparse bleeding cut.
12220 – 12250	SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, pinpoint green fluorescence, sparse bleeding cut.
12250 – 12280	SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, no fluorescence, no cut
12280 – 12310	SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, black shale stringers, no fluorescence, no cut
12310 – 12340	SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, black shale stringers, no fluorescence, slow fluorescent blue pinpoint cut that occurs ~15 min. after sitting
12340 – 12370	SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, overall even green pinpoint fluorescence, very slow fluorescent blue pinpoint cut that occurs ~15 min. after sitting
12370 – 12400	SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, overall uneven green pinpoint fluorescence, very slow fluorescent blue pinpoint cut that occurs ~15 min. after sitting
12400 – 14430	SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, overall even green pinpoint fluorescence, very fast fluorescent white cut, slower milky white bleeding cut

12430 – 12460 SILTSTONE: Gray, lithic, subangular to angular very fine grains, poorly sorted, horizontal laminations in ~30% of sample, very muddy, moderately to well indurated, argillaceous, extremely calcareous, black shale stringers, overall even green pinpoint fluorescence, fast fluorescent white cut

12460 – 12490 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~30% of sample, moderately to well indurated, argillaceous, extremely calcareous, overall even green pinpoint fluorescence, fast milky white cut

12490 – 12550 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~40% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, overall even green pinpoint fluorescence, faint cut

12550 – 12580 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~40% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, overall even green pinpoint fluorescence, fast fluorescent white cut with white streamers

12580 – 12610 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~40% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, overall even green pinpoint fluorescence, fast milky white cut with white streamers

12610 – 12640 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~40% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, black shale stringers, overall even green pinpoint fluorescence, fast milky white followed by slow green bleeding cut

12640 – 12670 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~40% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, overall even green pinpoint fluorescence, faint cut.

12670 – 12700 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, overall even green pinpoint fluorescence, fast fluorescent white cut.

12700 – 12730 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, overall even green pinpoint fluorescence, fast cloudy white cut.

12730 – 12760 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~30% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, overall even bright green pinpoint fluorescence, no cut.

12760 – 12790 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~40% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, overall even bright green pinpoint fluorescence, fast cloudy white cut.

12790 – 12820 SILTSTONE: Gray, lithic, subangular to angular, less silty, poorly sorted, horizontal laminations in ~30% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, overall even bright green pinpoint fluorescence, fast milky fluorescent white cut.

12820 – 12850 SILTSTONE: Gray, dark gray, lithic, subangular to angular, silty, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, very dolomitic, shale stringer, overall even bright green pinpoint fluorescence, fast cloudy white cut.

12850 – 12880 SILTSTONE: Gray, dark gray ,lithic, subangular to angular, silty, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringer, overall even bright green pinpoint fluorescence, fast cloudy white cut.

12880 – 12910 SILTSTONE: Gray, dark gray, lithic, subangular to angular, poorly sorted, horizontal laminations in ~30% of sample, moderately to well indurated, argillaceous, very calcareous, dolomitic, shale stringer overall even bright green pinpoint fluorescence, fast cloudy white cut.

12910 – 12940 SILTSTONE: Gray, dark gray, light brown, lithic, subangular to angular, silty, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, shale stringers, very dolomitic, overall even bright green pinpoint fluorescence, fast milky white cut.

12940 – 12970 SILTSTONE: Gray, dark gray, lithic, subangular to angular, silty, poorly sorted, horizontal laminations in ~30% of sample, moderately to well indurated, argillaceous, very calcareous, very dolomitic, shale stringers, overall even bright green pinpoint fluorescence, fast milky white cut.

12970 – 13000 SILTSTONE: Gray, dark gray, lithic, subangular to angular, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, calcareous, very dolomitic, overall even bright green pinpoint fluorescence, fast milky white cut.

13000 – 13030 SILTSTONE: Gray, dark gray, lithic, subangular to angular, silty, poorly sorted, horizontal laminations in ~20% of sample, moderately to well indurated, argillaceous, very calcareous, very dolomitic, abundant amount of shale stringers, overall even bright green pinpoint fluorescence, fast milky white cut.

13030 – 13060 SILTSTONE: Gray, dark gray, lithic, subangular to angular, silty, poorly sorted, horizontal laminations in ~10% of sample, moderately to well indurated, argillaceous, calcareous, abundant amount of shale stringers, dolomitic, overall even bright green pinpoint fluorescence, fast milky white cut.

13060 – 13090 SILTSTONE: Gray, dark gray, lithic, subangular to angular, silty, poorly sorted, horizontal laminations in ~10% of sample, moderately to well indurated, argillaceous, calcareous, abundant amount of shale stringers, very dolomitic, bright green pinpoint fluorescence, fast cloudy white cut.

13090 – 13120 SILTSTONE: Gray, dark gray, lithic, subangular to angular, silty, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, very dolomitic, abundant amount of shale stringers, green pinpoint fluorescence, fast cloudy white cut.

13120 – 13150 SILTSTONE: Gray, dark gray, lithic, subrounded, silty, very sandy, poorly sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, spot amount of free oil, green pinpoint fluorescence, fast cloudy white cut.

13150 – 13180 SILTSTONE: Gray, dark gray, lithic, subangular, silty, poorly sorted, laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, spot amount of free oil green pinpoint fluorescence, fast cloudy white cut.

13180 – 13210 SILTSTONE: Gray, dark gray, light brown lithic, subangular, silty, poorly sorted, laminations, moderately well indurated, argillaceous, very calcareous, shale stringers dolomitic, bright green pinpoint fluorescence, fast cloudy green cut.

13210 – 13240 SILTSTONE: Gray, dark gray, light brown, lithic, subrounded, to angular, silty, poorly sorted, laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright green pinpoint fluorescence, fast cloudy green cut.

13240 – 13270 SILTSTONE: Gray, dark gray, light brown, lithic, subrounded, silty, sandy, poorly sorted, laminations, moderately well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast green cloudy cut.

13270 – 13300 SILTSTONE: Gray, dark gray, light brown, lithic, subrounded, silty, sandy, poorly sorted, laminations, moderately well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, no cut.

13300 – 13330 SILTSTONE: Gray, dark gray, light brown, lithic, subrounded, silty, sandy, poorly sorted, laminations, moderately well indurated, argillaceous, very calcareous, spot of free standing oil, dolomitic, very bright even green pinpoint fluorescence, fast cloudy cut .

13330 – 13360 SILTSTONE: Gray, dark gray, light brown lithic, subrounded, silty, sandy, poorly sorted, laminations, moderately well indurated, argillaceous, calcareous, spot of free standing oil, dolomitic, bright even green pinpoint fluorescence, fast cloudy cut.

13360 – 13390 SILTSTONE: Gray, light brown, lithic, subrounded to subangular very fine grains, sandy, moderately well sorted, horizontal laminations much less apparent (~5%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut with white streamers

13390 – 13420 SILTSTONE: Gray, light brown, lithic, subrounded to subangular very fine grains, sandy, moderately well sorted, horizontal laminations much less apparent (~10% moderately to well indurated, argillaceous, calcareous, dolomitic, slightly carbonaceous, minor amount of brown oil saturation, bright even green pinpoint fluorescence, fast fluorescent white cut

13420 – 13450 SILTSTONE: Gray, light brown, lithic, subrounded to subangular very fine grains, sandy, moderately well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, calcareous, dolomitic, slightly carbonaceous, bright even green pinpoint fluorescence, fast fluorescent white cut

13450 – 13480 SILTSTONE: Gray, light brown, lithic, subrounded to subangular very fine grains, sandy, moderately well sorted, horizontal laminations (~30%), moderately to well indurated, argillaceous, calcareous, dolomitic, carbonaceous, bright even green pinpoint fluorescence, fast fluorescent white cut

13480 – 13510 SILTSTONE: Gray, light brown, lithic, subrounded to subangular very fine grains, sandy, moderately well sorted, horizontal laminations (~30%), moderately to well indurated, argillaceous, calcareous, dolomitic, carbonaceous, black shale stringer, possible minor amount of brown oil saturation, bright even green pinpoint fluorescence, fast milky white cut

13510 – 13540 SILTSTONE: Gray, light brown, lithic, subrounded to subangular very fine grains, sandy, moderately well sorted, horizontal laminations (~40%), moderately to well indurated, argillaceous, calcareous, dolomitic, possible minor amount of brown oil saturation, bright even green pinpoint fluorescence, fast milky white cut

13540 – 13570 SILTSTONE: Gray, light brown, lithic, subrounded to subangular very fine grains, sandy, moderately well sorted, horizontal laminations (~40%), moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut

13570 – 13600 SILTSTONE: Gray (mostly) with light brown and yellow angular grains intermixed, lithic, subrounded to angular very fine grains, sandy, poorly sorted, horizontal laminations (~45%), moderately to well indurated, argillaceous, very calcareous, bright even green pinpoint fluorescence, fast milky white cut with smaller patchy blue cut

13600 – 13630 SILTSTONE: Gray (mostly) with light brown and yellow angular grains intermixed, lithic, subrounded to angular very fine grains, sandy, moderately well sorted, horizontal laminations (~30%), moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut with slow milky white bleeding cut

13630 – 13660 SILTSTONE: Gray, light brown, lithic, subrounded to angular very fine grains, sandy, moderately well sorted, horizontal laminations (~30%), moderately to well indurated, pyritic, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut with white streamers

13660 – 13690 SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger angular grains, extremely sandy, moderately well sorted, horizontal laminations (~5%), moderately to well indurated, muddy cement, argillaceous, very calcareous, dolomitic, slightly carbonaceous, traces of red dolomite stringer, bright even green pinpoint fluorescence, fast fluorescent white cut

13690 – 13720 SILTSTONE: Gray, light brown, lithic, subrounded to angular very fine grains, sandy, moderately well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, slightly carbonaceous, bright even green pinpoint fluorescence, fast milky white cut

13720 – 13750 SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger angular grains, extremely sandy, moderately well sorted, horizontal laminations (~10%), moderately to well indurated, muddy cement, argillaceous, very calcareous, dolomitic, carbonaceous, bright even green pinpoint fluorescence, fast fluorescent white cut followed by greenish bleeding cut

13750 – 13780 SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with smaller amount of fine grained rounded particles, sandy, moderately well sorted, horizontal laminations (~30%), moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut

13780 – 13810 SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with smaller amount of fine grained rounded particles, sandy, moderately sorted, horizontal laminations (~45%), moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut

13810 – 13840 SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with fine grained rounded particles, very sandy, moderately sorted, horizontal laminations (~45%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut with white streamers

13840 – 13870 SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with fine grained rounded particles, very sandy, moderately sorted, horizontal and slightly undulating laminations (~50%), moderately to well indurated, argillaceous, calcareous, very dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut

13870 – 13900	SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with fine grained rounded particles, very sandy, moderately sorted, horizontal and slightly undulating laminations (~50%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut
13900 – 13930	SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with fine grained rounded particles, very sandy, moderately sorted, horizontal and slightly undulating laminations (~50%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut with streamers
13930 – 13960	SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with fine grained rounded particles, very sandy, moderately sorted, horizontal and slightly undulating laminations (~50%), moderately to well indurated, argillaceous, calcareous, dolomitic, pyritic, bright even green pinpoint fluorescence, fast fluorescent white cut with streamers
13960 – 13990	SILTSTONE: Gray, light brown, lithic, larger angular particles mixed with fine grained rounded particles, very sandy, moderately sorted, horizontal and slightly undulating laminations (~50%), moderately to well indurated, argillaceous, calcareous, dolomitic, pyritic, bright even green pinpoint fluorescence, fast milky white cut
13990 – 14020	SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~40%), moderately to well indurated, argillaceous, calcareous, dolomitic, pyritic, bright even green pinpoint fluorescence, fast milky white cut
14020 – 14050	SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~30%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut
14050 – 14080	SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut.
14080 – 14110	SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green pinpoint fluorescence, fast fluorescent white cut.
14110 – 14140	SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, very bright even green pinpoint fluorescence, fast cloudy cut.
14140 – 14170	SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~10%), moderately to well indurated, argillaceous, calcareous, dolomitic, very bright even green pinpoint fluorescence, fast cloudy white cut.
14170 – 14200	SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with angular grains, sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, very bright even green pinpoint fluorescence, fast milky white cut.

14200 – 14230 SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, very bright even green pinpoint fluorescence, fast milky white cut.

14230 – 14260 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, light brown to tan uneven oil stain, black, friable, tarry, dead oil, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut.

14260 – 14290 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, light brown to tan uneven oil stain, black, friable, tarry, dead oil, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut.

14290 – 14320 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, light brown to tan uneven oil stain, black, friable, tarry, dead oil, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut.

14320 – 14350 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, light brown to tan uneven oil stain, black, friable, tarry, dead oil, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut.

14350 – 14380 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, light brown to tan uneven oil stain, black, friable, tarry, dead oil, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut.

14380 – 14410 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, light brown to tan uneven oil stain, black, friable, tarry, dead oil, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut.

11410 – 14440 SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with angular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~10%), moderately to well indurated, argillaceous, calcareous, dolomitic, very bright even green pinpoint fluorescence, fast milky white cut.

14440 – 14470 SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with angular grains, sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, spotted free oil, dolomitic, very bright even green pinpoint fluorescence, fast milky white cut.

14470 – 14500 SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with angular grains, sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, minor amount of free oil, very bright even green pinpoint fluorescence, fast cloudy white cut.

14500 – 14530 SILTSTONE: Gray, light brown, lithic, many fine grained, well rounded particles mixed with larger subangular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

14530 – 14560 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, well rounded particles mixed with larger subangular grains, extremely sandy,, moderately sorted, horizontal and slightly undulating laminations (~10%), moderately to well indurated, argillaceous, calcareous, dolomitic, minor amount of free oil, bright even green fluorescence, fast cloudy white cut.

14560 – 14590 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, well rounded particles mixed with larger subangular grains, extremely sandy,, moderately sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, calcareous, spotted amount of free oil, dolomitic, bright even green fluorescence, fast cloudy white cut.

14590 – 14620 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, well rounded particles mixed with larger subangular grains, extremely sandy,, moderately sorted, laminations (~10%), moderately to well indurated, argillaceous, calcareous, dolomitic, minor amount of free oil bright even green fluorescence, fast cloudy white cut.

14620 – 14650 SILTSTONE: Gray, light brown, lithic, fine grained, well rounded particles mixed with larger subangular grains, extremely sandy,, moderately sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, calcareous, dolomitic, minor amount of free oil, bright even green fluorescence, fast cloudy white cut.

14650 – 14680 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, well rounded particles mixed with larger subangular grains, extremely sandy,, moderately sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

14680 – 14710 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

14710 – 14740 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

14740 – 14770 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast fluorescent white cut.

14770 – 14800 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, carbonaceous, bright even green fluorescence, fast fluorescent white cut

14800 – 14830 SILTSTONE: Gray, light brown, lithic, fine subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, , bright even green fluorescence, fast milky white cut

14830 – 14860 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast fluorescent white cut

14860 – 14890 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast fluorescent white cut with darker white bleeding cut

14890 – 14920 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast fluorescent white cut

14920 – 14950 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, slightly carbonaceous, bright even green fluorescence, fast fluorescent white cut with streamers

14950 – 14980 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, slightly carbonaceous, bright even green pinpoint fluorescence, fast milky white cut

14980 – 15010 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, red dolomite stringer, bright even green pinpoint fluorescence, fast milky white cut with streamers

15010 – 15040 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut with streamers

15040 – 15070 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut

15070 – 15100 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut

15100 – 15130 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut with slower bleeding cut

15130 – 15160 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut with streamers

15160 – 15190 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut with streamers

15190 – 15220 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright green pinpoint fluorescence, fast milky white cut with streamers

15220 – 15250 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright green pinpoint fluorescence, fast milky white cut with streamers

15250 – 15280 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, slightly carbonaceous, bright patchy green pinpoint fluorescence, fast fluorescent white cut

15280 – 15310 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright patchy green pinpoint fluorescence, fast milky white cut with streamers

15310 – 15340 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright patchy green pinpoint fluorescence, fast milky white cut

15340 – 15370 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut

15370 – 15400 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, extremely sandy,, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut with streamers

15400 – 15430 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut.

15430 – 15460 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, sandy in part, moderately to well sorted, laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut.

15460 – 15490 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, sandy in part, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, minor amount of free oil, dolomitic, bright even green pinpoint fluorescence, fast milky white cut.

15490 – 15520 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, bright even green pinpoint fluorescence, fast milky white cut.

15520 – 15550 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, spotted horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, fast milky white cut.

15550 – 15580 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, sandy, moderately to well sorted, horizontal and sometimes slightly undulating laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, dull fluorescence, fast cloudy white cut.

15580 – 15610 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, dull fluorescence, fast cloudy white milky.

15610 – 15640 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, minor amount of free oil, dolomitic, bright even green fluorescence, fast milky white.

15640 – 15670 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, bright even green fluorescence, fast milky white.

15670 – 15700 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, very bright even green fluorescence, fast milky.

15700 – 15730 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, minor amount of free oil, dolomitic, even green fluorescence, fast milky white cut with streamers.

15730 – 15760 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, bright even green fluorescence, fast bright milky white.

15760 – 15790 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, minor amount of free oil, dolomitic, bright even green fluorescence, fast milky white cut.

15790 – 15820 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut.

15820 – 15850 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, even green fluorescence, fast cloudy cut.

15850 – 15880 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, sandy, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy cut.

15880 – 15910 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, sandy, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy cut.

15910 – 15940 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, horizontal laminations, moderately to well indurated, minor amount of free oil, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut with streamers.

15940 – 15970 SILTSTONE: Gray, light brown, lithic, fine grained, subangular to angular grains, sandy in part, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky cloudy cut.

15970 – 16000 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, horizontal laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

16000 – 16030 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

16030 – 16060 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

16060 – 16090 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

16090 – 16120 SILTSTONE: Gray, light gray lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

16120 – 16150 SILTSTONE: Gray, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

16150 – 16180 SILTSTONE: Gray, light gray lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast cloudy white cut.

16180 – 16210 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut.

16210 – 16240 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast milky white cut.

16240 – 16270 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, muddy cement, slightly carbonaceous, argillaceous, very calcareous, dolomitic, bright even green fluorescence, fast fluorescent white cut

16270 – 16300 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut with streamers

16300 – 16330 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to subangular grains, very sandy, moderately to well sorted, spotted laminations, moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut

16330 – 16360 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut with streamers.

16360 – 16390 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut

16390 – 16420 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut with streamers

16420 – 16450 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, slow milky white cut

16450 – 16480 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, slow milky white cut

16480 – 16510 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, trace amounts of brown oil saturation, even green pinpoint fluorescence, fast fluorescent white cut with streamers

16510 – 16540 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, slightly carbonaceous, even green pinpoint fluorescence, fast milky white cut

16540 – 16570 SILTSTONE: Gray, light brown, lithic, fine to very fine grained, subrounded to angular grains, very sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, slightly carbonaceous, even green pinpoint fluorescence, fast fluorescent white cut

16570 – 16600 SILTSTONE: Gray, light brown, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, muddy cement, argillaceous, very calcareous, dolomitic, slightly carbonaceous, even green pinpoint fluorescence, fast fluorescent white cut

16600 – 16630 SILTSTONE: Gray with smaller subrounded yellow/white particles, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, muddy cement, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut

16630 – 16660 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, muddy cement, argillaceous, very calcareous, dolomitic, slightly carbonaceous, even green pinpoint fluorescence, fast fluorescent white cut

16660 – 16690 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut

16690 – 16720 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut

16720 – 16750 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast milky white cut

16750 – 16780 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut with streamers

16780 – 16810 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast milky white cut.

16810 – 16840 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast milky white cut.

16840 – 16870 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~30%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast milky cloudy cut.

16870 – 16900 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast milky white cut.

16900 – 16930 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast milky cloudy cut.

16930 – 16960 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

16960 – 16990 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

16990 – 17020 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17020 – 17050 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, sandy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17050 – 17080 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, sandy, moderately to well sorted, horizontal laminations (20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, even green pinpoint fluorescence, fast cloudy white cut.

17080 – 17110 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, even green pinpoint fluorescence, fast cloudy white cut.

17110 – 17140 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, sandy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, even green pinpoint fluorescence, fast cloudy white cut.

17140 – 17170 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, sandy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, minor amount of free oil, even green pinpoint fluorescence, fast cloudy white cut.

17170 – 17200 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17200 – 17230 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17230 – 17260 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17260 – 17290 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to angular grains, sandy, moderately to well sorted, horizontal laminations (~30%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17290 – 17320 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to angular grains, sandy, moderately to well sorted, horizontal laminations (~30%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17320 – 17350 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17350 – 17380 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17380 – 17410 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17410 – 17440 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to angular grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17440 – 17470 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, extremely sandy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green fluorescence, fast cloudy white cut.

17470 – 17500 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green fluorescence, fast cloudy white cut.

17500 – 17530 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, muddy, trace amounts of free oil, even green pinpoint fluorescence, fast cloudy white cut.

17530 – 17560 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, muddy, trace amounts of free oil, even green pinpoint fluorescence, fast cloudy white cut.

17560 – 17590 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, muddy, trace amounts of free oil, uneven green pinpoint fluorescence, fast cloudy white cut.

17590 – 17620 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, uneven green pinpoint fluorescence, fast cloudy white cut.

17620 – 17650 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, uneven green pinpoint fluorescence, fast cloudy white cut.

17650 – 17680 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, uneven green pinpoint fluorescence, fast dull cloudy white cut.

17680 – 17710 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, uneven green pinpoint fluorescence, fast very dull cloudy cut.

17710 – 17740 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, uneven green pinpoint fluorescence, fast cloudy white cut.

17740 – 17770 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, very bright even green pinpoint fluorescence, fast cloudy white cut.

17770 – 17800 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy white cut.

17800 – 17830 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, very bright even green pinpoint fluorescence, fast cloudy white cut.

17830 – 17860 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast dull cloudy cut

17860 – 17890 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast dull cloudy cut

17890 – 17920 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, faint cut

17920 – 17950 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, bright even green pinpoint fluorescence, faint cut

17950 – 17980 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, faint cut

17980 – 18010 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, dull even green pinpoint fluorescence, faint cut

18010 – 18040 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, faint cut.

18040 – 18070 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, cloudy white cut.

18070 – 18100 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, cloudy white cut.

18100 – 18130 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, dull even green pinpoint fluorescence, faint cut.

18130 – 18160 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, dull even green pinpoint fluorescence, faint to no cut.

18160 – 18190 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, dull even green pinpoint fluorescence, fast cloudy cut.

18190 – 18220 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, dull even green pinpoint fluorescence, fast cloudy cut.

18220 – 18250 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, dull even green pinpoint fluorescence, fast cloudy cut.

18250 – 18280 SILTSTONE: Gray, cream mottled, lithic, very fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~5%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy cut.

18280 – 18310 SILTSTONE: Gray, cream mottled, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy cut.

18310 – 18340 SILTSTONE: Gray, dark gray, lithic, fine grained, subangular to angular, grains, muddy, moderately to well sorted, horizontal laminations (~40%), moderately to well indurated, argillaceous, calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy cut.

18340 – 18370 SILTSTONE: Gray, dark gray, lithic, fine grained, subangular to angular, grains, muddy, moderately to well sorted, horizontal laminations (~40%), moderately to well indurated, argillaceous, calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy cut.

18370 – 18400 SILTSTONE: Gray, dark gray, lithic, fine grained, subangular to angular, grains, muddy, moderately to well sorted, horizontal laminations (~40%), moderately to well indurated, argillaceous, calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy cut.

18400 – 18430 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to angular, grains, muddy, moderately to well sorted, horizontal laminations (~40%), moderately to well indurated, argillaceous, calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy cut.

18430 – 18460 SILTSTONE: Gray, cream mottled, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast cloudy cut.

18460 – 18490 SILTSTONE: Gray, cream mottled, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, faint cloudy cut.

18490 – 18520 SILTSTONE: Gray, dark gray, lithic, fine grained, subangular to angular, grains, muddy, moderately to well sorted, horizontal laminations (~40%), moderately to well indurated, argillaceous, calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut.

18520 – 18550 SILTSTONE: Gray, cream mottled, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut.

18550 – 18580 SILTSTONE: Gray, cream mottled, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut.

18580 – 18610 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~10%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green fluorescence, fast white cloudy cut.

18610 – 18640 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green fluorescence, fast white cloudy cut.

18640 – 18670 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green fluorescence, fast white cloudy cut.

18670 – 18700 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut.

18700 – 18730 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut.

18730 – 18760 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut.

18760 – 18790 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut, gradually changing to fluorescent

18790 – 18820 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut, gradually changing to fluorescent white

18820 – 18850 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut, gradually changing to fluorescent white

18850 – 18880 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut, gradually changing to fluorescent white

18880 – 18910 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut, light green bleeding cut

18910 – 18940 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast white cloudy cut, gradually changing to fluorescent white

18940 – 18970 SILTSTONE: Gray, dark gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut

18970 – 19000 SILTSTONE: Gray, lithic, fine grained, subrounded to subangular, grains, muddy, moderately to well sorted, horizontal laminations (~20%), moderately to well indurated, argillaceous, very calcareous, dolomitic, even green pinpoint fluorescence, fast fluorescent white cut

19030 – 19060 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 15% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut

19060 – 19090 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut

19090 – 19120 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 5% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut

19120 – 19150 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut

19150 – 19180 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 5% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, white stringers, dark yellow residual stain after cut

19180 – 19210 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 15% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, white stringers, dark yellow residual stain after cut

19210 – 19240 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 15% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, white stringers, dark yellow residual stain after cut

19240 – 19270 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, numerous white stringers, dark yellow residual stain after cut

19270 – 19300 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, white stringers, dark yellow residual stain after cut

19300 – 19333 SANDSTONE: Light gray to medium gray, tan, very fine to fine grained quartz, moderately well to well sorted, grains are rounded to well rounded, calcitic cementation, poorly indurated, 10% Dolomite: Gray, angular to subangular, finely laminated, spotted free oil, brilliant overall green/yellow fluorescence, instant bright white cut, white stringers, dark yellow residual stain after cut

TD at 19,333' MD, 1:45 PM MDT, June 1, 2011.

Distribution List

G3 Operating, LLC 475 17th St. Suite 1210 Denver, CO 80202 Attn: Roger Hively	2 copies
Intervention Energy LLC 6501 25th avenue NW Minot, ND 58703-8833 Attn: John Zimmerman (FedEx)	1 copy
Resolute Northern Rockies 1675 Broadway, Suite 1950 Denver, CO 80202 Attn: Sean Marshall	1 copy
Marathon Oil Company Attn: Bakken Subsurface Manager 555 Felipe Road Houston, TX 77056 or P.O. Box 3128 Houston, TX 77253	1 copy
Samson Resources Company 370 17th Street, Suite 3000 Denver, CO 80202 Attn: Ken Thompkins and 2 West 2nd Street Tulsa, OK 74103 Attn: Kathy Staton	1 copy
Western Energy Corp 118 First Avenue West Williston, ND 58801	1 copy
NDIC Oil and Gas Division 600 East Blvd. Ave., Dept. 405 Bismarck, ND 58505-0840	1 copy

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

JUN 2011 RECEIVED ND OIL & GAS DIVISION

Well File No. **20552**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☐ Notice of Intent	Approximate Start Date **May 21, 2011**	☐ Drilling Prognosis	☐ Spill Report
☑ Report of Work Done	Date Work Completed **May 15, 2011**	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other	**Cut 150' core and run OH logs.**

Well Name and Number					
Muller 1-21-16H					
Footages	Qtr-Qtr	Section	Township	Range	
300 F S L 1220 F WL	**SESW**	**21**	**158 N**	**103 W**	
Field	Pool	County			
Wildcat	**Middle Bakken**	**Williams**			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
G3 Operating, LLC			
Address	City	State	Zip Code
475 17th St., Suite 1210	**Denver**	**CO**	**80202**

DETAILS OF WORK

G3 Operating cut 150' core from 9580' MD/TVD to 9730' MD/TVD. The core was LD and the hole was drilled to 9880' MD/TVD. A 750' cement plug was set from 9000' MD/TVD to 9750' MD/TVD. The first plug was dressed down to 9182' MD/TVD, cement was contaminated and did not set. A second plug was set from 8702' MD/TVD to 9182' MD/TVD. The second plug was dressed down to 9058' MD/TVD. POOH and begin drilling the curve.

*All plugback information should be reported on the Form 6 Completion Report when that form is filed.

Company **G3 Operating, LLC**		Telephone Number **(303) 297-2028**
Address **475 17th St., Suite 1210**		
City **Denver**	State **CO**	Zip Code **80202**
Signature	Printed Name **Aldo Gurmendi**	
Title **Drilling Engineer**	Date **May 15, 2011**	
Email Address **agurmendi@g3operating.com**		

FOR STATE USE ONLY

☒ Received	☐ Approved
Date 7-1-2011	
By	
Title **Richard A. Suggs Geologist**	

Industrial Commission of North Dakota
Oil and Gas Division
Verbal Approval To Purchase and Transport Oil

Well or Facility No **20552**

Tight Hole **Yes**

OPERATOR

Operator	Representative	Rep Phone
G3 OPERATING, LLC	**Connie Hval**	

WELL INFORMATION

Well Name: **MULLER 1-21-16H**

Inspector: **John Axtman**

Well Location	QQ	Sec	Twp		Rng		County
	SWSW	**21**	**158**	**N**	**103**	**W**	**WILLIAMS**

Field: **CLIMAX**

Footages: **300** Feet From the **S** Line; **1270** Feet From the **W** Line

Pool: **BAKKEN**

Date of First Production Through Permanent Wellhead **7/1/2011** **This Is The First Sales**

PURCHASER / TRANSPORTER

Purchaser	Transporter
PLAINS MARKETING, L.P.	**PLAINS MARKETING, L.P.**

TANK BATTERY

Single Well Tank Battery Number :

SALES INFORMATION **This Is The First Sales**

ESTIMATED BARRELS TO BE SOLD	ACTUAL BARRELS SOLD	DATE
5000 BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	

DETAILS

Will call b ack with first oil sales and production rate.

Start Date	**6/29/2011**
Date Approved	**6/29/2011**
Approved By	**John Axtman**

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

JUN 2011
RECEIVED
ND OIL & GAS
DIVISION

Well File No.
20552
NDIC CTB No.
120552

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
Muller 1-21-16H	SWSW	21	158 N	103 W	Williams

Operator	Telephone Number	Field
G3 Operating, LLC	303-297-2028	Climax

Address	City	State	Zip Code
475 17th St, Ste 1210	Denver	CO	80202

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
Plains Marketing, L.P.	713-646-4100	100%	July 1, 2011

Principal Place of Business	City	State	Zip Code
PO Box 4648	Houston	TX	77210

Field Address	City	State	Zip Code
303 6th Ave NE	Belfield	ND	58622

Name of Transporter	Telephone Number	% Transported	Date Effective
Plains Marketing, L.P.	701-575-4349	100%	July 1, 2011

Address	City	State	Zip Code
303 6th Ave NE	Belfield	ND	58622

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments

I hereby swear or affirm that the information herein provided is true, complete and correct as determined from all available records. Date: June 28, 2011

Signature	Printed Name	Title
Connie Hval	Connie Hval	Production Analyst

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
Kelli Pflug	Kelli Pflug	Office Manager

FOR STATE USE ONLY

Date Approved	JUN 30 2011
By	Annette Rabyan
Title	Oil & Gas Production Analyst

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

APR 2011 RECEIVED

Well File No. **20552**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☑ Notice of Intent	Approximate Start Date **February 21, 2011**	☐ Drilling Prognosis	☐ Spill Report
☐ Report of Work Done	Date Work Completed	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other	**Location Construction, size reduction**

Well Name and Number					
Muller 1-21-16H					
Footages	Qtr-Qtr	Section	Township	Range	
300 F N L 1270 F E L	**SESW**	**21**	**158 N**	**103 W**	
Field	Pool	County			
Wildcat		**Williams**			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Dirt Contractor: Seifert Enterprises, LLC	**Phone: 719 783 2757**	**Fax: 719 783 2988**	
Address	City	State	Zip Code
198 Range View Loop	**Westcliffe**	**Colorado**	**81252**

DETAILS OF WORK

The Muller 1-21-16H will have the location size reduced from the original 500' N/S by 500' E/W to 370' N/S by 500' E/W. The old surface plats and newly designed surface plats are attached for reference.

Company		Telephone Number
G3 Operating, LLC		**(303) 278-2028**
Address		
475 17th Street		
City	State	Zip Code
Denver	**Co**	**80202**
Signature	Printed Name	
	Aldo R. Gurmendi	
Title	Date	
Drilling Engineer	**February 1, 2011**	
Email Address		
agurmendi@g3operating.com		

FOR STATE USE ONLY

☐ Received	☒ Approved
Date	4-12-11
By	Nathaniel Erbele
Title	Petroleum Resource Specialist

G3 OPERATING, LLC

MULLER #1-21-16H

LOCATED IN WILLIAMS COUNTY, NORTH DAKOTA
SECTION 21, T158N, R103W, 5th P.M.

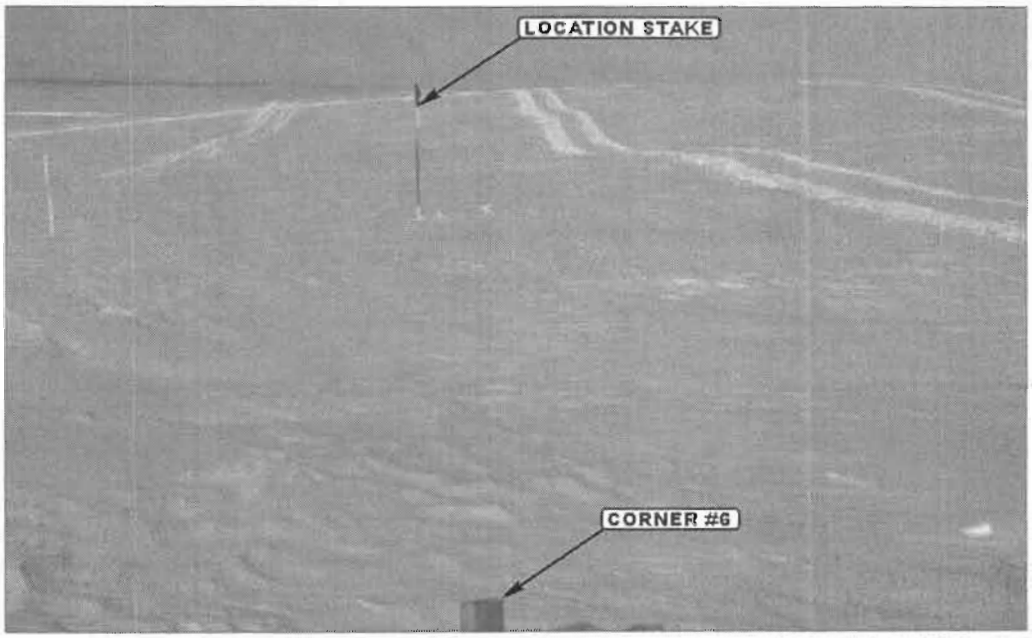


PHOTO: VIEW FROM CORNER #6 TO LOCATION STAKE — CAMERA ANGLE: NORTHERLY

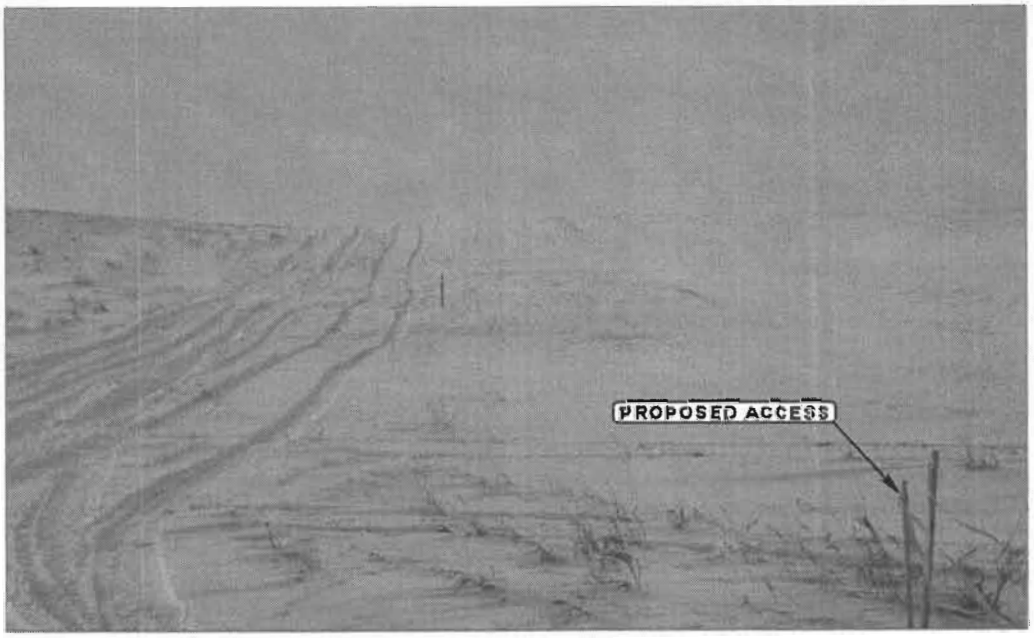


PHOTO: VIEW FROM BEGINNING OF PROPOSED ACCESS — CAMERA ANGLE: WESTERLY

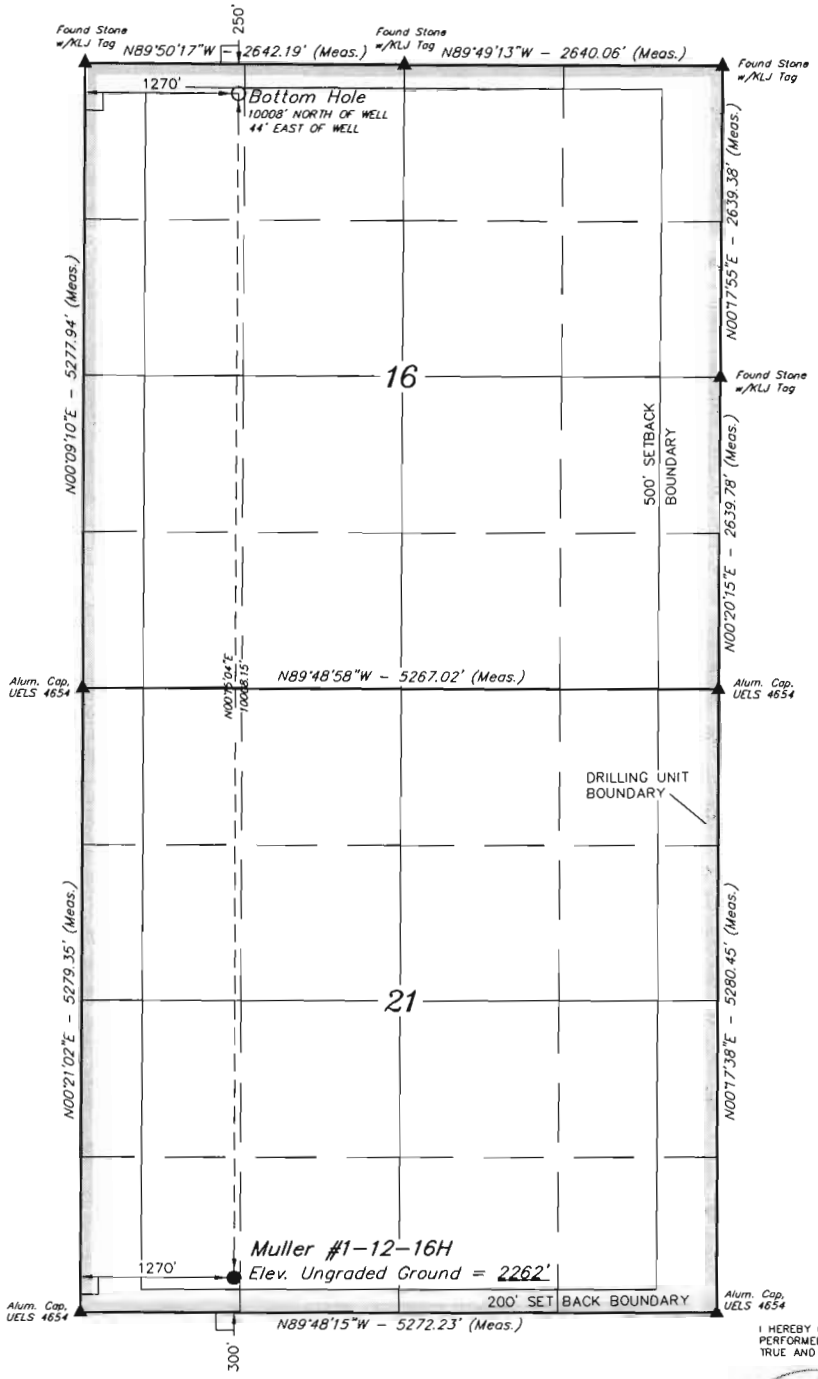
Uintah Engineering & Land Surveying
85 South 200 East Vernal, Utah 84078
(435) 789-1017 * FAX (435) 789-1813

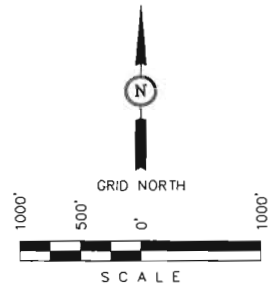
LOCATION PHOTOS	12 MONTH	21 DAY	10 YEAR	PHOTO
TAKEN BY: S.A.	DRAWN BY: Z.L.	REVISED: 00-00-00		

WELL LOCATION PLAT
T158N, R103W, 5th P.M.

G3 OPERATING, LLC

Well location, Muller #1-21-16H, located as shown in the SW 1/4 SW 1/4 of Section 21, T158N, R103W, 5th P.M., Williams County, North Dakota.





VERTICAL CONTROL DATUM: NAVD88

CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

TROY JENSEN REGISTERED LAND SURVEYOR 4654 NORTH DAKOTA

REGISTERED LAND SURVEYOR
REGISTRATION NO. 4654
STATE OF NORTH DAKOTA

LEGEND:

└ = 90° SYMBOL

● = PROPOSED WELL HEAD.

▲ = SECTION CORNERS LOCATED.

REVISED: 01-26-11

[derived from: N.G.S. O.P.U.S. Solution REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000)]

NAD 83 (TARGET BOTTOM HOLE)	NAD 83 (SURFACE LOCATION)
LATITUDE = 48°31'02.12" (48.517256) LONGITUDE = 104°00'36.47" (104.010131)	LATITUDE = 48°29'23.38" (48.489828) LONGITUDE = 104°00'36.50" (104.010139)
NAD 27 (TARGET BOTTOM HOLE)	**NAD 27 (SURFACE LOCATION)**
LATITUDE = 48°31'02.03" (48.517231) LONGITUDE = 104°00'34.71" (104.009642)	LATITUDE = 48°29'23.29" (48.489803) LONGITUDE = 104°00'34.74" (104.009650)

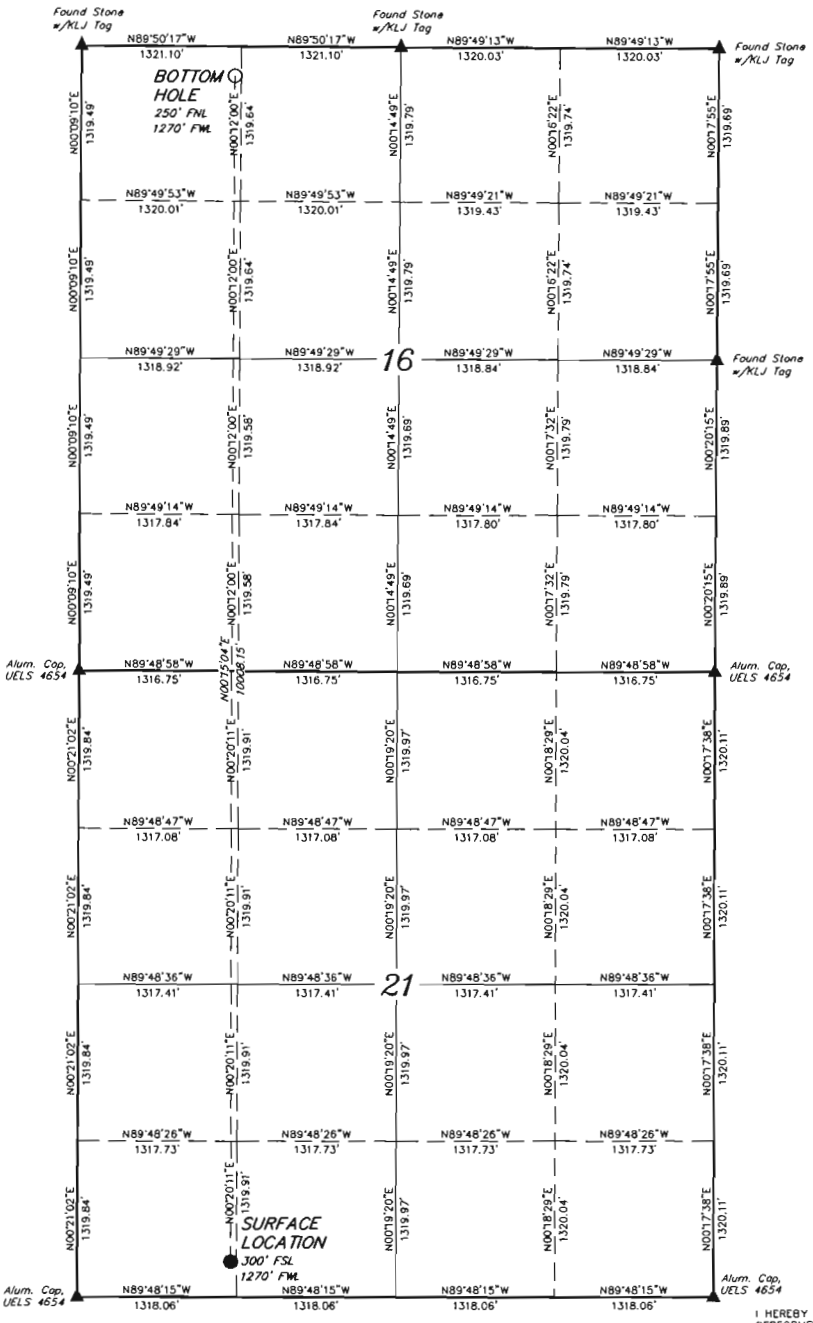
UINTAH ENGINEERING & LAND SURVEYING
85 SOUTH 200 EAST - VERNAL, UTAH 84078
(435) 789-1017

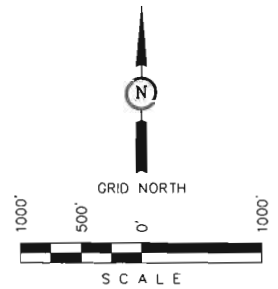
SCALE 1" = 1000'	DATE SURVEYED: 11-12-10	DATE DRAWN: 12-15-10
PARTY S.A. T.G. S.B.	REFERENCES G.L.O. PLAT	
WEATHER COLD	FILE G3 OPERATING, LLC	

SECTION BREAKDOWN
T158N, R103W, 5th P.M.

G3 OPERATING, LLC

Well location, Muller #1-21-16H, located as shown in the SW 1/4 SW 1/4 of Section 21, T158N, R103W, 5th P.M., Williams County, North Dakota.





VERTICAL CONTROL DATUM: NAVD88

CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

TROY JENSEN REGISTERED LAND SURVEYOR 4654 NORTH DAKOTA

REGISTERED LAND SURVEYOR
REGISTRATION NO. 4654
STATE OF NORTH DAKOTA

LEGEND:

└ = 90° SYMBOL

● = PROPOSED WELL HEAD.

▲ = SECTION CORNERS LOCATED.

REVISED: 01-26-11

[derived from: N.G.S. O.P.U.S. Solution REF FRAME: NAD_83(CORS96)(EPOCH: 2002.0000)]

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NAD 27 (TARGET BOTTOM HOLE)	**NAD 27 (SURFACE LOCATION)**
LATITUDE = 48°31'02.03" (48.517231) LONGITUDE = 104°00'34.71" (104.009642)	LATITUDE = 48°29'23.29" (48.489803) LONGITUDE = 104°00'34.74" (104.009650)

UINTAH ENGINEERING & LAND SURVEYING
85 SOUTH 200 EAST - VERNAL, UTAH 84078
(435) 789-1017

SCALE 1" = 1000'	DATE SURVEYED: 11-12-10	DATE DRAWN: 12-15-10
PARTY S.A. T.G. S.B.	REFERENCES G.L.O. PLAT	
WEATHER COLD	FILE G3 OPERATING, LLC	

G3 OPERATING, LLC

PAD LAYOUT FOR

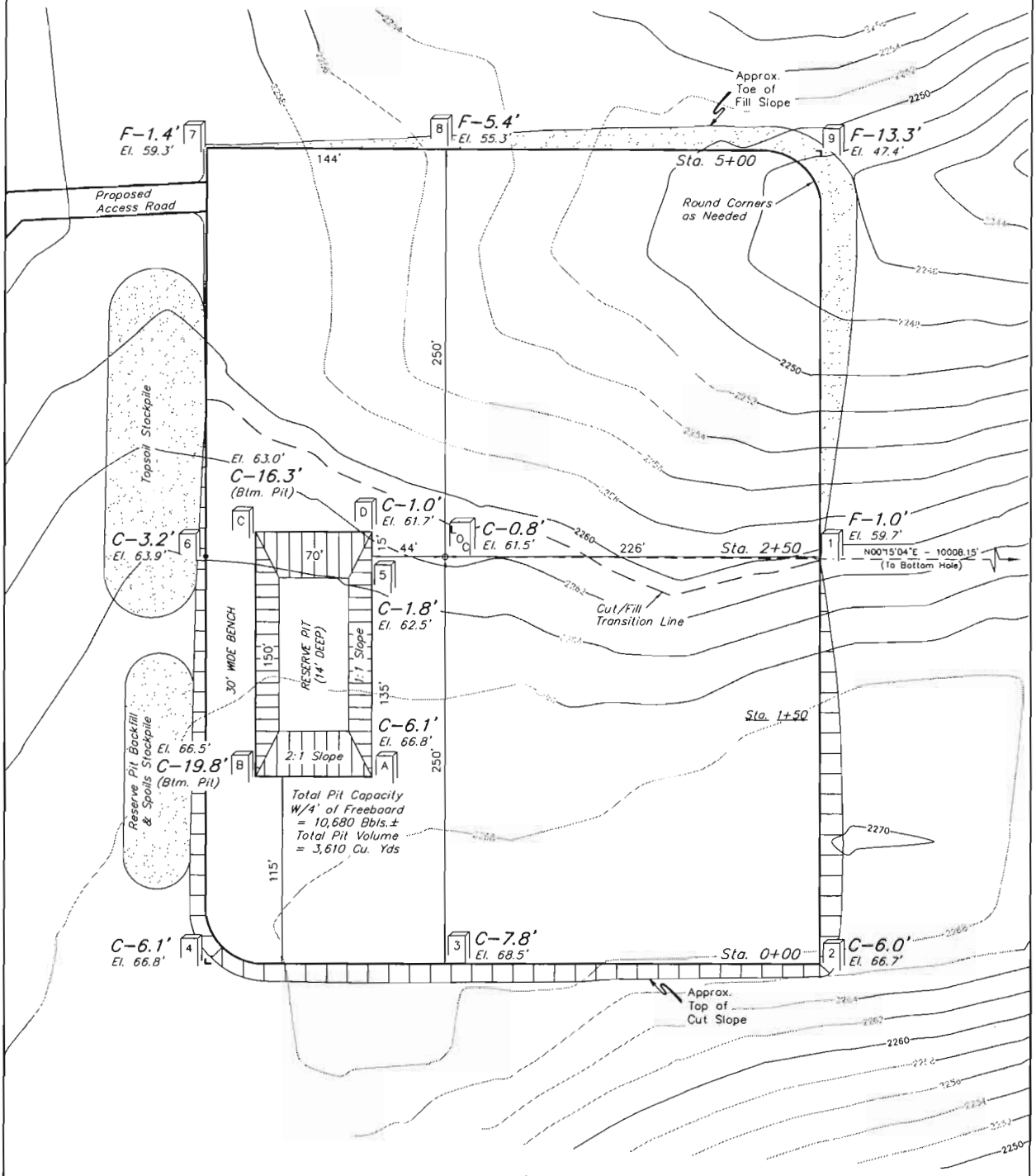
MULLER #1-21-16H

SECTION 21, T158N, R103W, 5th P.M.

300' FSL 1270' FWL

FIGURE #1

SCALE: 1" = 60'
DATE: 12-15-10
DRAWN BY: S.B.
REVISED: 01-26-11



Elev. Ungraded Ground At Loc. Stake = 2261.5'
FINISHED GRADE ELEV. AT LOC. STAKE = 2260.7'

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East • Vernal, Utah 84078 • (435) 789-1017

1" = 40'
X-Section Scale
1" = 100'

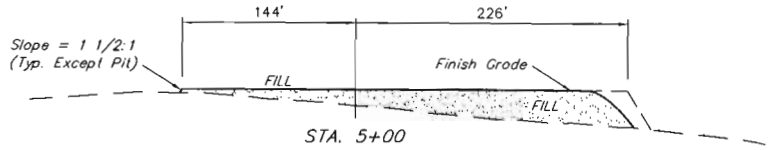
DATE: 12-15-10
DRAWN BY: S.B.
REVISED: 01-26-11

G3 OPERATING, LLC

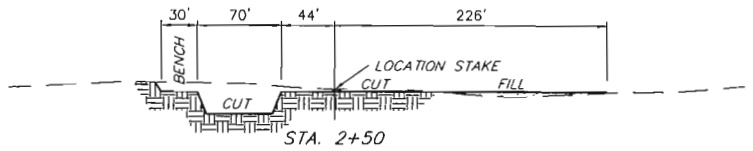
TYPICAL CROSS SECTION FOR

MULLER #1-21-16H
SECTION 21, T158N, R103W, 5th P.M.
300' FSL 1270' FWL

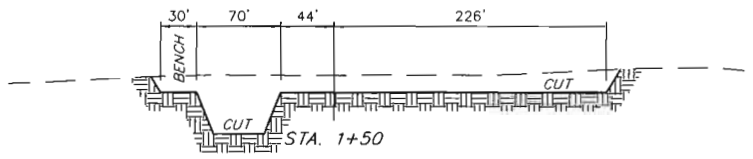
FIGURE #2



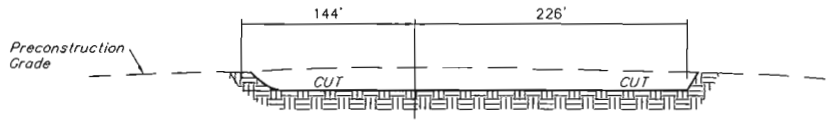
STA. 5+00



STA. 2+50



STA. 1+50



STA. 0+00

NOTE:
Topsoil should not be Stripped Below Finished Grade on Substructure Area.

APPROXIMATE ACREAGES
WELL SITE DISTURBANCE = ± 4.994 ACRES
ACCESS ROAD DISTURBANCE = ± 2.981 ACRES
TOTAL = ± 7.975 ACRES

* NOTE:
FILL QUANTITY INCLUDES 5% FOR COMPACTION

APPROXIMATE YARDAGES

(6") Topsoil Stripping	=	3,810 Cu. Yds.	EXCESS MATERIAL	=	5,620 Cu. Yds.
Remaining Location	=	19,630 Cu. Yds.	Topsoil & Pit Backfill (1/2 Pit Vol.)	=	5,620 Cu. Yds.
Reserve Pit Cut	=	3,610 Cu. Yds.			
TOTAL CUT	=	27,050 CU.YDS.	EXCESS UNBALANCE (After Interim Rehabilitation)	=	0 Cu. Yds.
FILL	=	21,430 CU.YDS.			

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East • Vernal, Utah 84078 • (435) 789-1017

G3 OPERATING, LLC

ACCESS ROAD LAYOUT FOR

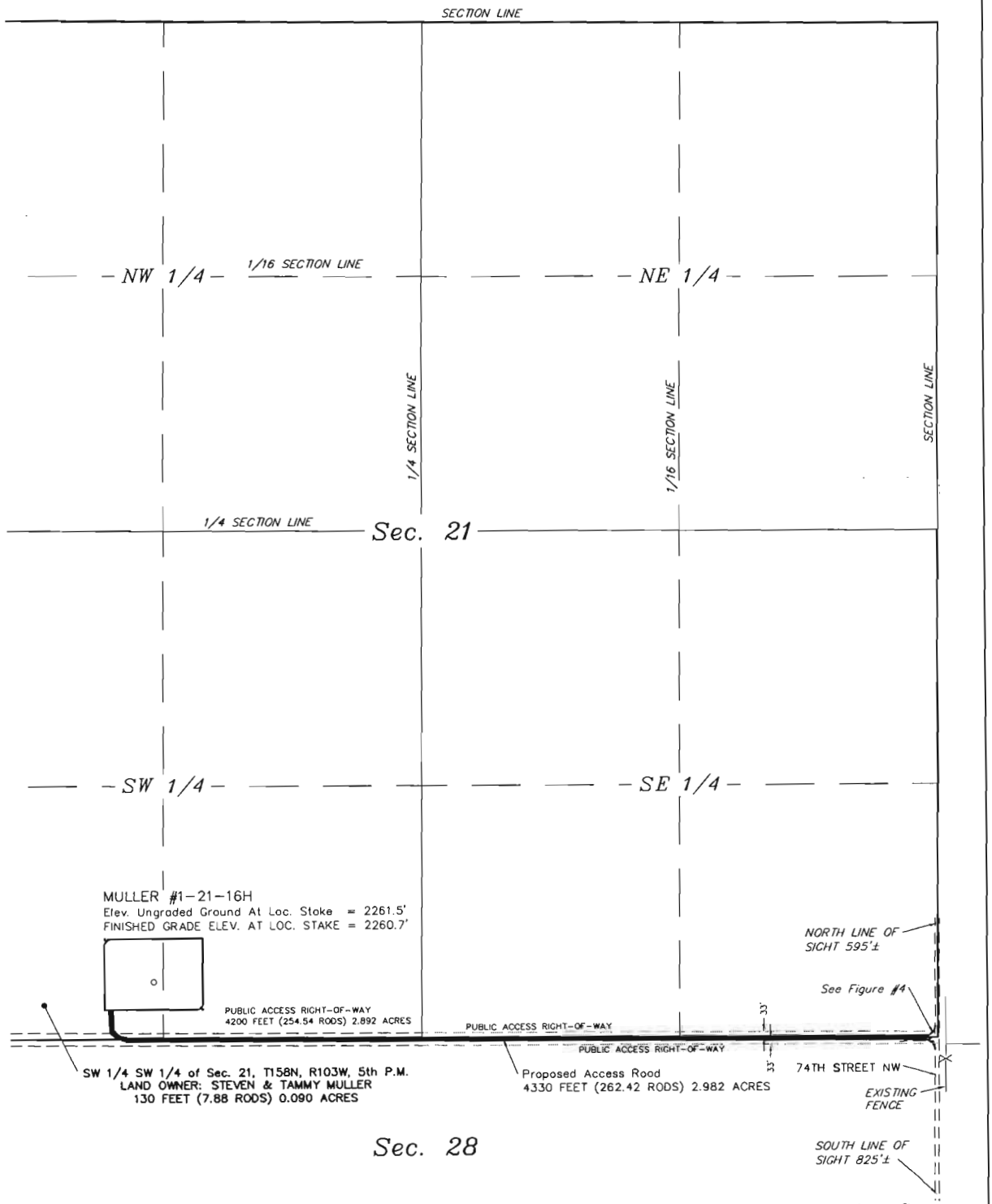
MULLER #1-21-16H

SECTION 21, T158N, R103W, 5th P.M.

300' FSL 1270' FWL

FIGURE #3

GRID NORTH
SCALE: 1" = 300'
DATE: 12-15-10
DRAWN BY: S.B.
REVISED: 01-26-11



UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East • Vernal, Utah 84078 • (435) 789-1017

G3 OPERATING, LLC

TYPICAL ROAD ACCESS FOR

MULLER #1-21-16H

SECTION 21, T158N, R103W, 5th P.M.

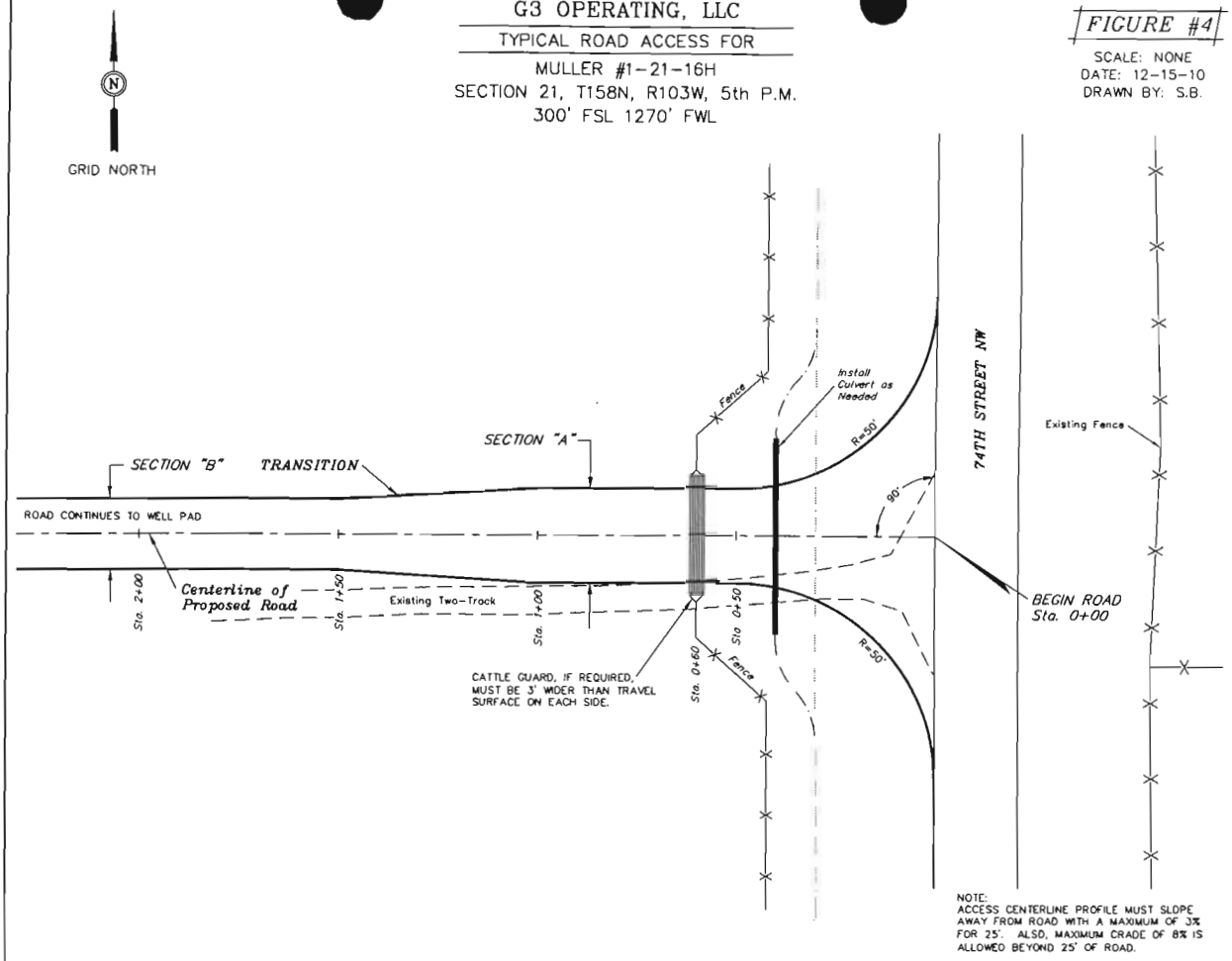
300' FSL 1270' FWL

FIGURE #4

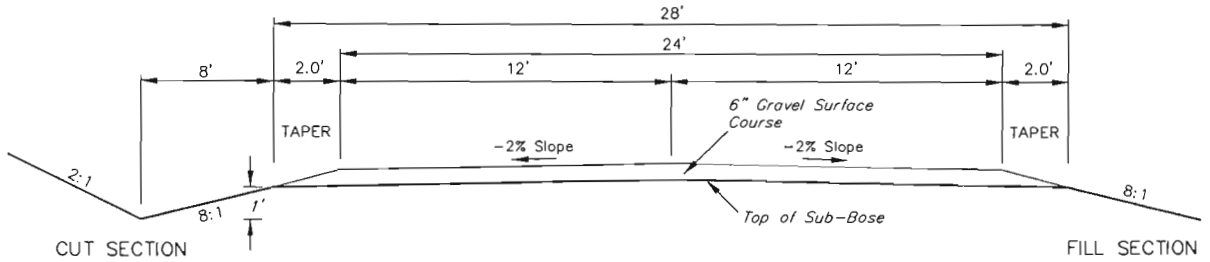
SCALE: NONE

DATE: 12-15-10

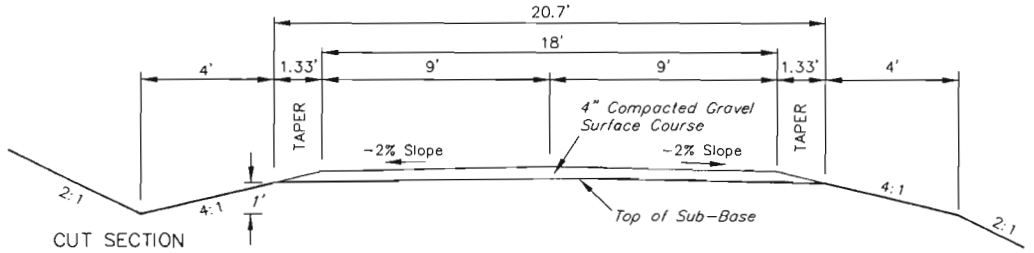
DRAWN BY: S.B.



NOTE:
ACCESS CENTERLINE PROFILE MUST SLOPE AWAY FROM ROAD WITH A MAXIMUM OF 3% FOR 25'. ALSO, MAXIMUM GRADE OF 8% IS ALLOWED BEYOND 25' OF ROAD.



SECTION "A"



SECTION "B"

UINTAH ENGINEERING & LAND SURVEYING
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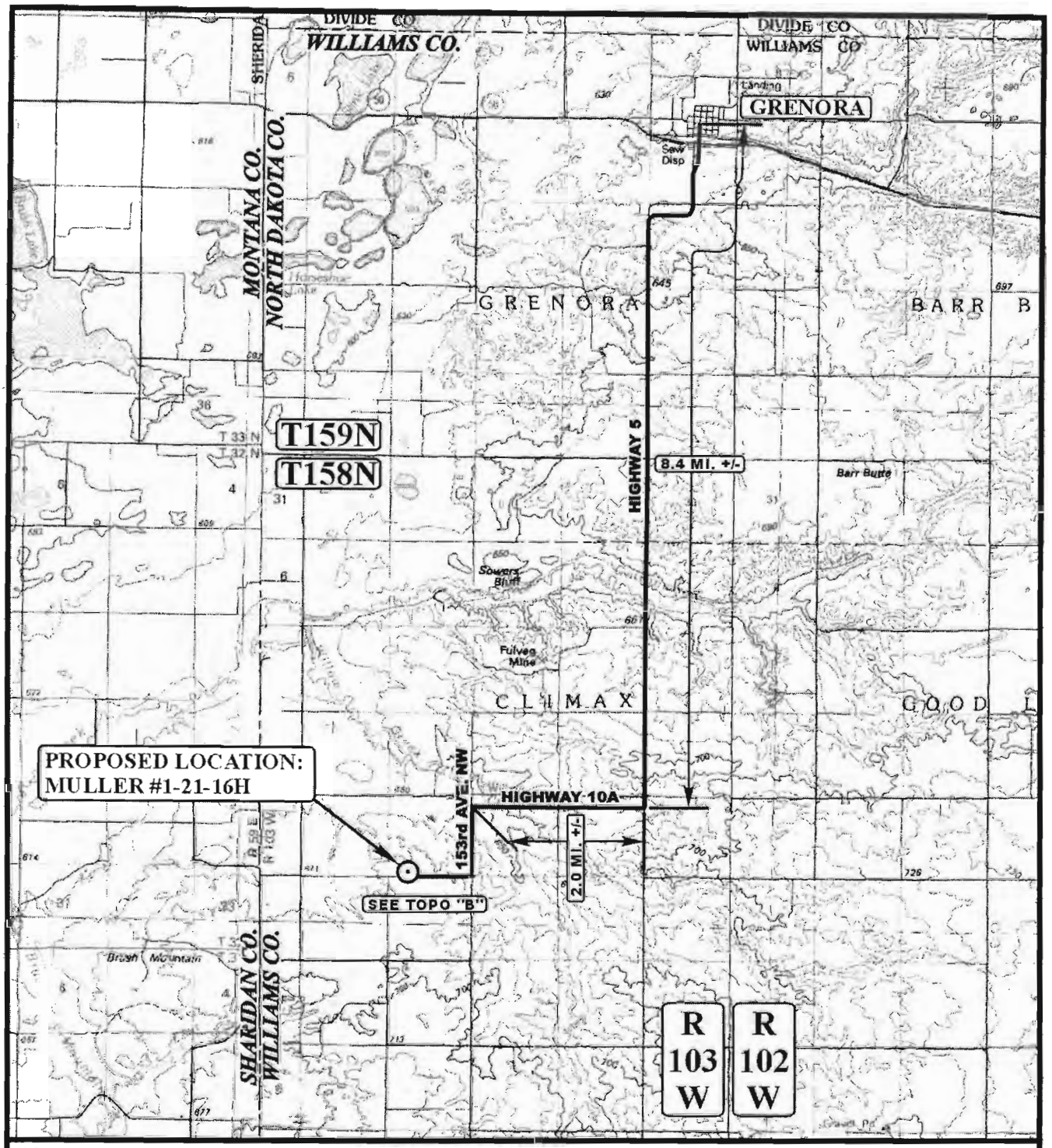
G3 OPERATING, LLC
MULLER #1-21-16H
SECTION 21, T158N, R103W, 5th P.M.

PROCEED IN A SOUTHERLY DIRECTION FROM GRENORA, NORTH DAKOTA ALONG HIGHWAY 5 APPROXIMATELY 8.4 MILES TO THE JUNCTION OF THIS ROAD AND HIGHWAY 10A TO THE WEST; TURN RIGHT AND PROCEED IN A WESTERLY DIRECTION APPROXIMATELY 2.0 MILES TO THE JUNCTION OF THIS ROAD AND 153rd AVE. NW TO THE SOUTH; TURN LEFT AND PROCEED IN A SOUTHERLY DIRECTION APPROXIMATELY 1.0 MILES TO THE BEGINNING OF THE PROPOSED ACCESS TO THE WEST; FOLLOW ROAD FLAGS IN A WESTERLY DIRECTION APPROXIMATELY 4328' TO THE PROPOSED LOCATION.

TOTAL DISTANCE FROM GRENORA, NORTH DAKOTA TO THE PROPOSED WELL LOCATION IS APPROXIMATELY 12.2 MILES.



LEGEND:

⊙ PROPOSED LOCATION

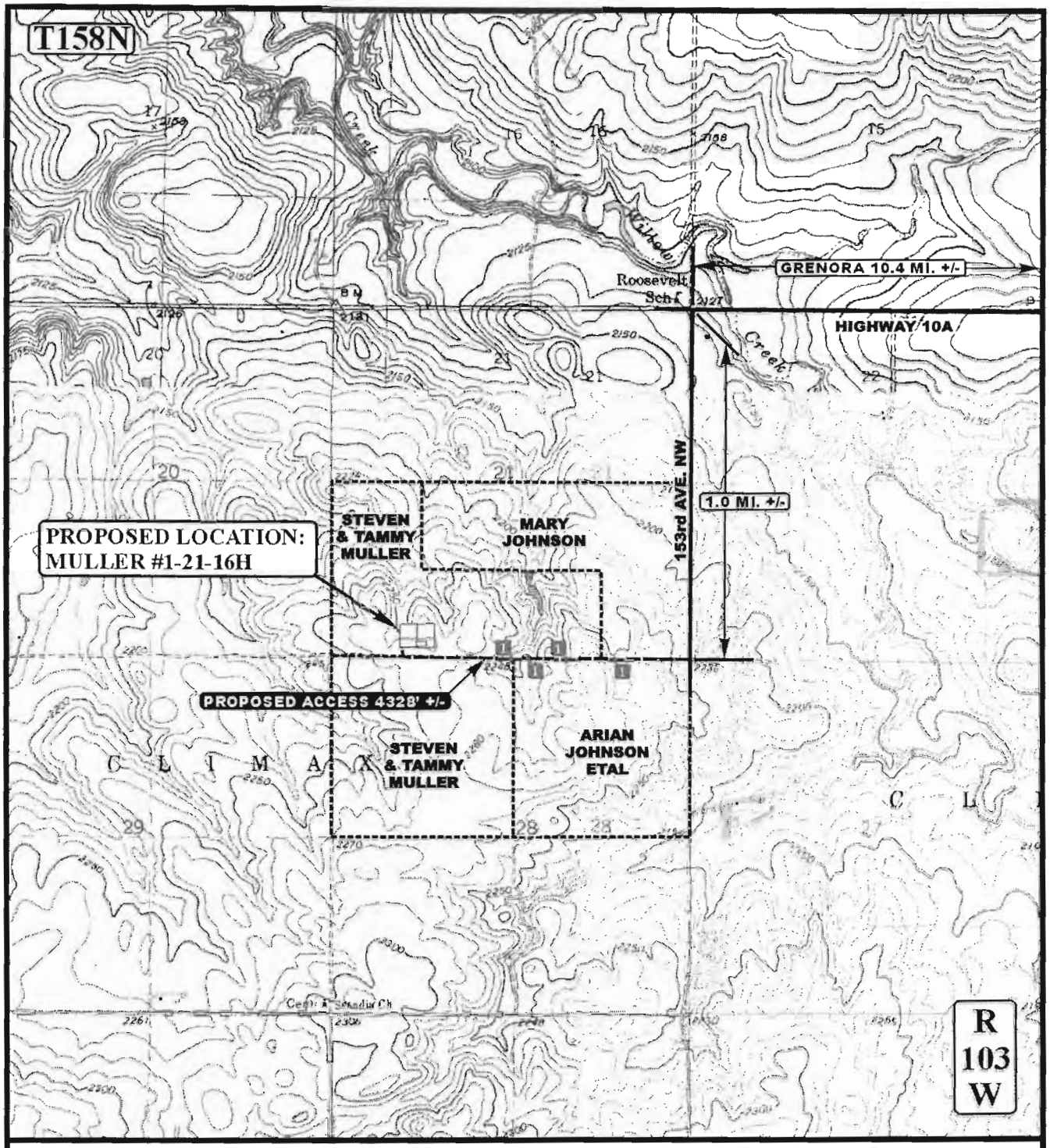
N

G3 OPERATING, LLC

MULLER #1-21-16H
SECTION 21, T158N, R103W, 5th P.M.
300' FSL 1270' FWL

Uintah Engineering & Land Surveying
85 South 200 East Vernal, Utah 84078
(435) 789-1017 * FAX (435) 789-1813

TOPOGRAPHIC MAP	12 MONTH	21 DAY	10 YEAR	A TOPO
SCALE: 1:100,000	DRAWN BY: Z.L.	REVISED: 00-00-00		



LEGEND:

EXISTING ROAD

PROPOSED ACCESS ROAD

1 24" CMP REQUIRED

N

G3 OPERATING, LLC

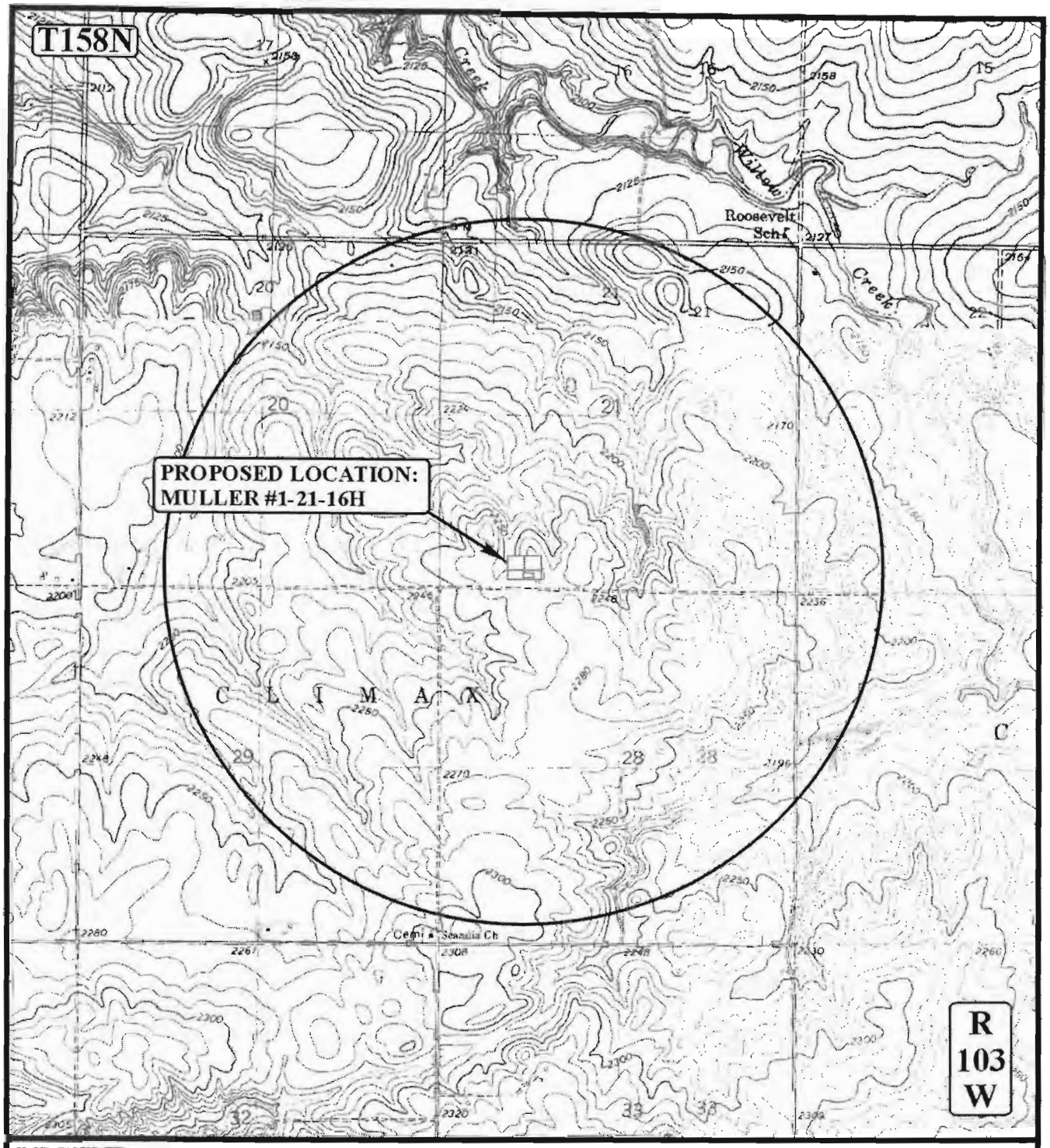
MULLER #1-21-16H

SECTION 21, T158N, R103W, 5th P.M.

300' FSL 1270' FWL

Uintah Engineering & Land Surveying
85 South 200 East Vernal, Utah 84078
(435) 789-1017 * FAX (435) 789-1813

TOPOGRAPHIC MAP	12 MONTH	21 DAY	10 YEAR	B TOPO
SCALE: 1" = 2000'	DRAWN BY: Z.L.	REVISED: 01-26-11		



LEGEND:

- DISPOSAL WELLS
- PRODUCING WELLS
- SHUT IN WELLS
- WATER WELLS
- ABANDONED WELLS
- TEMPORARILY ABANDONED

N

G3 OPERATING, LLC

MULLER #1-21-16H
SECTION 21, T158N, R103W, 5th P.M.
300' FSL 1270' FWL

Uintah Engineering & Land Surveying
85 South 200 East Vernal, Utah 84078
(435) 789-1017 * FAX (435) 789-1813

TOPOGRAPHIC MAP	12 MONTH	21 DAY	10 YEAR	C TOPO
SCALE: 1" = 2000'	DRAWN BY: Z.L.	REVISED: 01-26-11		

Oil and Gas Division 20552

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.oilgas.nd.gov

TIM MUNIZ
G3 OPERATING, LLC
475 17TH ST SUITE 1210
DENVER, CO 80202 USA

Date: **3/7/2011**

RE: CORES AND SAMPLES

Well Name: **MULLER 1-21-16H** Well File No.: **20552**
Location: **SWSW 21-158-103** County: WILLIAMS
Permit Type: **Development - HORIZONTAL**
Field: **CLIMAX** Target Horizon: BAKKEN

Dear Tim Muniz:

North Dakota Century Code (NDCC) Section 38-08-04 provides for the preservation of cores and samples and their shipment to the State Geologist when requested. The following is required on the above referenced well:

1) All cores, core chips and samples must be submitted to the State Geologist as provided for the NDCC Section 38-08-04 and North Dakota Administrative Code 43-02-03-38.1.

2) Samples shall include all cuttings from:

Base of the Last Charles Salt

Samples of cuttings shall be taken at 30' maximum intervals through all vertical, build and horizontal sections. Samples must be washed, dried, packed in sample envelopes in correct order with labels showing operator, well name, location and depth, and forwarded in standard boxes to the State Geologist within 30 days of the completion of drilling operations.

3) Cores: ALL CORES cut shall be preserved in correct order, properly boxed, and forwarded to the State Geologist within 90 days of completion of drilling operations. Any extension of time must have written approval from the State Geologist.

4) All cores, core chips, and samples must be shipped, prepaid, to the State Geologist at the following address:

ND Geological Survey Core Library
Campus Road and Cornell
Grand Forks, ND 58202

5) NDCC Section 38-08-16 allows for a civil penalty for any violation of Chapter 38 08 not to exceed $12,500 for each offense, and each day's violation is a separate offense.

Sincerely

Richard A. Suggs
Geologist

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.oilgas.nd.gov

March 3, 2011

Jennifer Foy
Senior Landman
G3 OPERATING, LLC
475 Seventeenth Street, Suite 1210
Denver, CO 80202

RE: HORIZONTAL WELL
MULLER 1-21-16H
SWSW Section 21-158N-103W
Williams County
Well File # 20552

Dear Jennifer:

Pursuant to Commission Order No. 16121, approval to drill the above captioned well is hereby given. The approval is granted on the condition that all portions of the well bore not isolated by cement, be no closer than the **200' setback** from the north & south boundaries and **1220' setback** (per Commission policy) from the east & west boundaries within the 1280 acre spacing unit consisting of Sections 16 & 21-T158N-R103W.

PERMIT STIPULATIONS: G3 OPERATING LLC must contact NDIC Field Inspector John Axtman at 701-770-2564 prior to location construction.

Location Construction Commencement (Three Day Waiting Period)

Operators shall not commence operations on a drill site until the 3rd business day following publication of the approved drilling permit on the NDIC - OGD Daily Activity Report. If circumstances require operations to commence before the 3rd business day following publication on the Daily Activity Report, the waiting period may be waived by the Director. Application for a waiver must be by sworn affidavit providing the information necessary to evaluate the extenuating circumstances, the factors of NDAC 43-02-03-16.2 (1), (a)-(f), and any other information that would allow the Director to conclude that in the event another owner seeks revocation of the drilling permit, the applicant should retain the permit.

Permit Fee & Notification

Payment was received in the amount of $100 via credit card. It is requested that notification be given immediately upon the spudding of the well. This information should be relayed to the Oil & Gas Division, Bismarck, via telephone. The following information must be included: Well name, legal location, permit number, drilling contractor, company representative, date and time of spudding. Office hours are 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. Central Time. Our telephone number is (701) 328-8020, leave a message if after hours or on the weekend.

Survey Requirements for Horizontal, Horizontal Re-entry, and Directional Wells

NDAC Section 43-02-03-25 (Deviation Tests and Directional Surveys) states in part (that) the survey contractor shall file a certified copy of all surveys with the director free of charge within thirty days of completion. Surveys must be submitted as one electronic copy, or in a form approved by the director. However, the director may require the directional survey to be filed immediately after completion if the survey is needed to conduct the operation of the director's office in a timely manner. Certified surveys must be submitted via email in one adobe document, with a certification cover page to certsurvey@nd.gov.
Survey points shall be of such frequency to accurately determine the entire location of the well bore.

Confidential status

Your request for confidential status of all information furnished to the Director, or his representatives, is hereby granted. Such information, except production runs, shall remain confidential for six months commencing on the date the well is spud.

Confidential status notwithstanding, the Director and his representatives shall have access to all well records wherever located. Your company personnel, or any person performing work for your company shall permit the Director and his representatives to come upon any lease, property, well, or drilling rig operated or controlled by them, complying with all safety rules, and to inspect the records and operation of such wells and to have access at all times to any and all records of wells. The Commission's field personnel periodically inspect producing and drilling wells. Any information regarding such wells shall be made available to them at any time upon request. The information so obtained by the field personnel shall be maintained in strict confidence and shall be available only to the Commission and its staff.

Drilling pit

Please be advised approval for use of a drilling reserve pit or drill cuttings pit on this site is contingent on site specific conditions and special pit closure requirements may apply.

Surface casing cement

Tail cement utilized on surface casing must have a minimum compressive strength of 500 psi within 12 hours, and tail cement utilized on production casing must have a minimum compressive strength of 500 psi before drilling the plug or initiating tests.

Logs

NDAC Section 43-02-03-31 requires the running of a Cement Bond Log from which the presence of cement can be determined in every well in which production or intermediate casing has been set and a Gamma Ray Log must be run from total depth to ground level elevation of the well bore. All logs must be submitted as one paper copy and one digital copy in LAS (Log ASCII) format, or a format approved by the Director. Image logs that include, but are not limited to, Mud Logs, Cement Bond Logs, and Cyberlook Logs, cannot be produced in their entirety as LAS (Log ASCII) files. To create a solution and establish a standard format for industry to follow when submitting image logs, the Director has given approval for the operator to submit an image log as a TIFF (*.tif) formatted file. The TIFF (*.tif) format will be accepted only when the log cannot be produced in its entirety as a LAS (Log ASCII) file format. The digital copy may be submitted on a standard CD, or attached to an email sent to digitallogs@nd.gov Thank you for your cooperation.

Sincerely,

Ryan Ellis
Engineering Tech IV

APPLICATION FOR PERMIT TO DRILL HORIZONTAL WELL - FORM 1H

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 54269 (08-2005)

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

Type of Work	Type of Well	Approximate Date Work Will Start	Confidential Status
New Location	Oil & Gas	2 / 1 / 2011	Yes

Operator	Telephone Number
G3 OPERATING, LLC	303-297-2028

Address	City	State	Zip Code
475 Seventeenth Street, Suite 1210	Denver	CO	80202

☑ Notice has been provided to the owner of any permanently occupied dwelling within 1,320 feet.

☑ This well is not located within five hundred feet of an occupied dwelling.

WELL INFORMATION **(If more than one lateral proposed, enter data for additional laterals on page 2)**

Well Name	Well Number
MULLER	1-21-16H

Surface Footages	Qtr-Qtr	Section	Township	Range	County
300 F S L 1270 F W L	SWSW	21	158 N	103 W	Williams

Longstring Casing Point Footages	Qtr-Qtr	Section	Township	Range	County
873 F S L 1273 F W L	SWSW	21	158 N	103 W	Williams

Longstring Casing Point Coordinates From Well Head	Azimuth	Longstring Total Depth
573 N From WH 3 E From WH	0.26 °	9967 Feet MD 9640 Feet TVD

Bottom Hole Footages From Nearest Section Line	Qtr-Qtr	Section	Township	Range	County
258 F N L 1316 F W L	NWNW	16	158 N	103 W	Williams

Bottom Hole Coordinates From Well Head	KOP Lateral 1	Azimuth Lateral 1	Estimated Total Depth Lateral 1
10000 N From WH 46 E From WH	9067 Feet MD	0.26 °	19401 Feet MD 9640 Feet TVD

Latitude of Well Head	Longitude of Well Head	NAD Reference	Description of (Subject to NDIC Approval)
48 ° 29 ' 23.38 "	-104 ° 00 ' 36.5 "	NAD83	Spacing Unit: Sections 16 & 21-T158N-R103W

Ground Elevation	Acres in Spacing/Drilling Unit	Spacing/Drilling Unit Setback Requirement	Industrial Commission Order
2262 Feet Above S.L.	1280	200 Feet N/S 1220 Feet E/W	16121

North Line of Spacing/Drilling Unit	South Line of Spacing/Drilling Unit	East Line of Spacing/Drilling Unit	West Line of Spacing/Drilling Unit
5282 Feet	5272 Feet	10560 Feet	10557 Feet

Objective Horizons	Pierre Shale Top
Middle Bakken	1575

Proposed	Size	Weight	Depth	Cement Volume	
Surface Casing	9 - 5/8 "	36 Lb./Ft.	2000 Feet	695 Sacks	**NOTE: Surface hole must be drilled with fresh water and surface casing must be cemented back to surface.**

Proposed	Size	Weight(s)	Longstring Total Depth	Cement Volume	Cement Top	Top Dakota Sand
Longstring Casing	7 - 0 "	29 & 32 Lb./Ft.	9967 Feet MD 9640 Feet TVD	635 Sacks	4495 Feet	4995 Feet

Base Last Charles Salt (If Applicable)	
8205 Feet	**NOTE: Intermediate or longstring casing string must be cemented above the top Dakota Group Sand.**

Proposed Logs
OH Logs: DLL/GR/SP/Density/Neutron/Sonic, Cased hole:CBL w/GR, CCL & CIL

Drilling Mud Type (Vertical Hole - Below Surface Casing)	Drilling Mud Type (Lateral)
Invert	Brine

Survey Type in Vertical Portion of Well	Survey Frequency: Build Section	Survey Frequency: Lateral	Survey Contractor
SWD Every 100 Feet	30 Feet	90 Feet	Pathfinder

NOTE: A Gamma Ray log must be run to ground surface and a CBL must be run on intermediate or longstring casing string if set.

Surveys are required at least every 30 feet in the build section and every 90 feet in the lateral section of a horizontal well. Measurement inaccuracies are not considered when determining compliance with the spacing/drilling unit boundary setback requirement except in the following scenarios: 1) When the angle between the well bore and the respective boundary is 10 degrees or less and the well bore is within 150 feet of the respective setback requirement; or 2) If industry standard methods and equipment are not utilized. Consult the applicable field order for exceptions.

If measurement inaccuracies are required to be considered, a 2° MWD measurement inaccuracy will be applied to the horizontal portion of the well bore. This measurement inaccuracy is applied to the well bore from KOP to TD.

REQUIRED ATTACHMENTS: Certified surveyor's plat, horizontal section plat, estimated geological tops, proposed mud/cementing plan, directional plot/plan, $100 fee.

See Page 2 for Comments section and signature block.

COMMENTS, ADDITIONAL INFORMATION, AND/OR LIST OF ATTACHMENTS

Lateral 2

KOP Lateral 2 Feet MD	Azimuth Lateral 2 °	Estimated Total Depth Lateral 2 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

Lateral 3

KOP Lateral 3 Feet MD	Azimuth Lateral 3 °	Estimated Total Depth Lateral 3 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

Lateral 4

KOP Lateral 4 Feet MD	Azimuth Lateral 4 °	Estimated Total Depth Lateral 4 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

Lateral 5

KOP Lateral 5 Feet MD	Azimuth Lateral 5 °	Estimated Total Depth Lateral 5 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

I hereby swear or affirm the information provided is true, complete and correct as determined from all available records.

Date **1 / 12 / 2011**

ePermit	Printed Name **Jennifer Foy**	Title **Senior Landman**

FOR STATE USE ONLY

Permit and File Number **20552**	API Number **33 - 105 - 02157**
Field **CLIMAX**	
Pool **BAKKEN**	Permit Type **DEVELOPMENT**

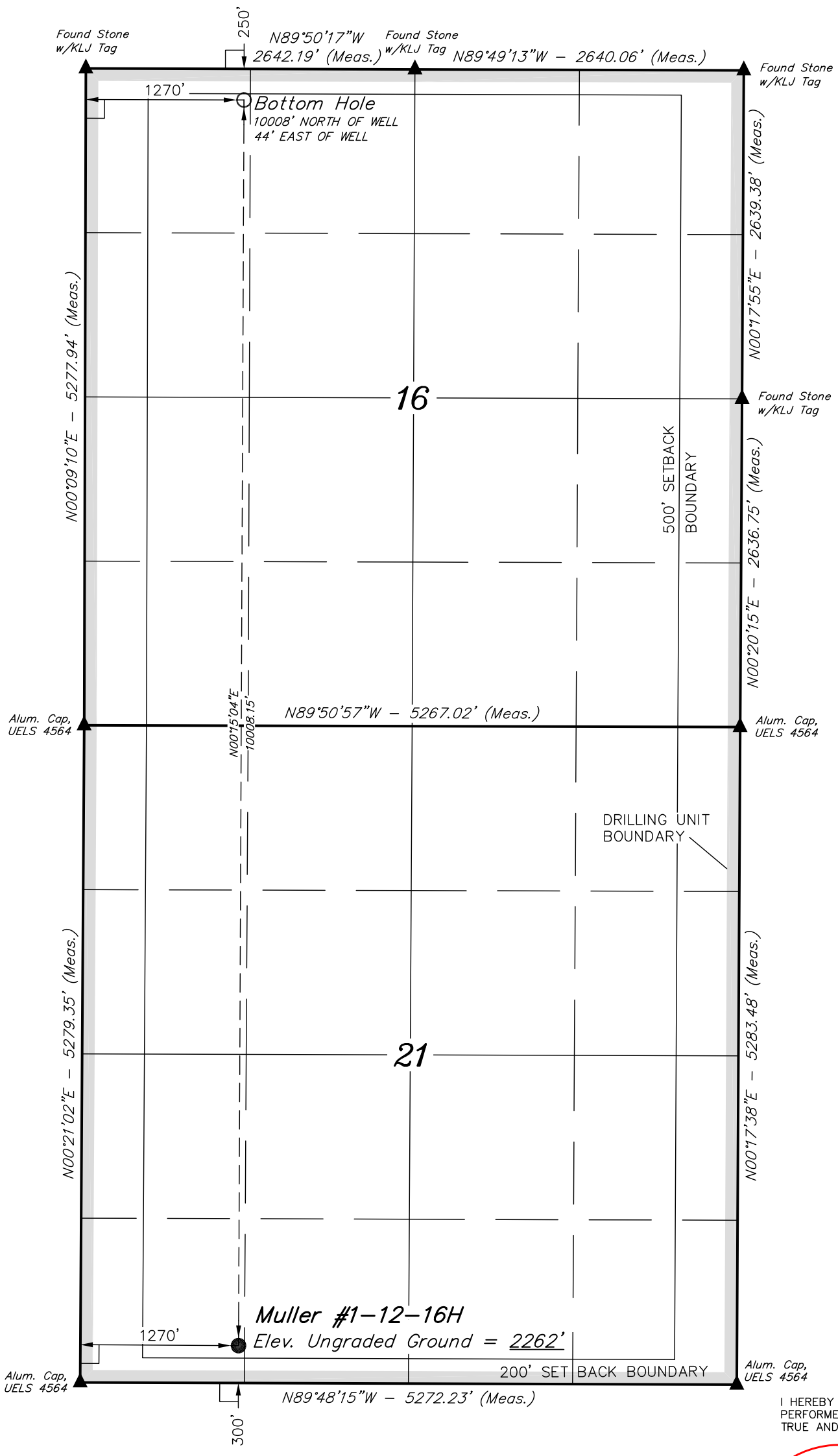
FOR STATE USE ONLY

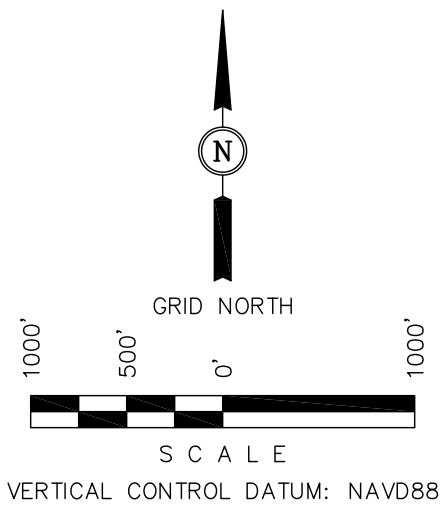
Date Approved **3 / 3 / 2011**
By **Ryan Ellis**
Title **Engineering Tech IV**

WELL LOCATION PLAT
T158N, R103W, 5th P.M.

G3 OPERATING, LLC

Well location, Muller #1–21–16H, located as shown in the SW 1/4 SW 1/4 of Section 21, T158N, R103W, 5th P.M., Williams County, North Dakota.





CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

TROY JENSEN
REGISTERED LAND SURVEYOR
L.S. 4654
NORTH DAKOTA

REGISTERED LAND SURVEYOR
REGISTRATION NO. 4654
STATE OF NORTH DAKOTA

LEGEND:

└ = 90° SYMBOL

● = PROPOSED WELL HEAD.

▲ = SECTION CORNERS LOCATED.

[derived from: N.G.S. O.P.U.S. Solution REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000)]

NAD 83 (TARGET BOTTOM HOLE)	NAD 83 (SURFACE LOCATION)
LATITUDE = 48°31'02.12" (48.517256) LONGITUDE = 104°00'36.47" (104.010131)	LATITUDE = 48°29'23.38" (48.489828) LONGITUDE = 104°00'36.50" (104.010139)
NAD 27 (TARGET BOTTOM HOLE)	**NAD 27 (SURFACE LOCATION)**
LATITUDE = 48°31'02.03" (48.517231) LONGITUDE = 104°00'34.71" (104.009642)	LATITUDE = 48°29'23.29" (48.489803) LONGITUDE = 104°00'34.74" (104.009650)

UINTAH ENGINEERING & LAND SURVEYING
85 SOUTH 200 EAST – VERNAL, UTAH 84078
(435) 789–1017

SCALE 1" = 1000'	DATE SURVEYED: 11–12–10	DATE DRAWN: 12–15–10
PARTY S.A. M.N. S.B.	REFERENCES G.L.O. PLAT	
WEATHER COLD	FILE G3 OPERATING, LLC	

Attachment 1

The following lists the required information to complete the permit to drill the Muller 1-21-16H.

The Muller 1-21-16H is a planned, 1280-acre spacing horizontal with surface hole located in Sec.21 T158N R103W and PBHL is in Sec.16 T158N R103W. The 8 ¾" vertical hole will be drilled down to KOP of 9067' MD/TVD. The 8 ¾" curve has a planned BUR of 10°/100' to 90° at a 0.26° azimuth. The EOC is estimated to be 9967' MD / 9640' TVD. The 6" production hole lateral will be drilled to TMD of 19401' MD / 9967' TVD. The proposed wellbore geometry is tabulated below with additional interval section detailed below.

Muller 1-21-16H Wellbore Geometry				
Interval	Hole Size	Drill Fluid	Csg. / Liner size	MD / TVD
Conductor	20	Dry	16"	60 / 60
Surface	13 ½"	WBM	9 5/8" 36#	2000' / 2000'
Intermediate	8 ¾"	OBM	7" 29# & 32#	9967' / 9640'
Production	6"	Brine	4 ½" 13.5# (liner)	19401' / 9640'

1. Form 1 (Application for Permit to Drill) enclosed.
2. $100.00 fee enclosed.
3. See **Attachment 2**. *Well Location Plat* prepared by Uintah Surveying.
4. The objective formation is the Middle Bakken Member.
5. Estimated formation tops and markers – See **Attachment 3**, *Directional Well Plan*
6. **Surface Hole Data**: A) Drilling Fluid, B) Casing Data, C) Cement Data

A) Surface Drill Fluid Data				
Fluid Type	MW Range	Funnel Vis.	Yield Point	Water Loss
Water	8.4 – 9.0	28 - 32	As needed	NC

B) Surface Casing Data				
Size	Weight	Type	Connection	Plan Set Depth
9 5/8"	36#	J-55	STC	2000' MD

C) Surface Cement Data (70% excess)				
Slurry / Fluid	Weight	Yield (ft3/sk)	Total Sxs / Bbl	Top of Cement
Water Spacer	8.33		0 / 20	NA
Lead	11.5	2.97	480	Surface
Tail	13.0	2.01	215	1700

7. **Intermediate Hole Data**: A) Drilling Fluid, B) Casing Data, C) Cement Data

A) Intermediate Hole Drill Fluid Data				
Fluid Type	MW Range	Funnel Vis.	Yield Point	Oil / Water
Oil Base	9.5 – 10.2	40 – 50	10 – 15	75/25 – 80/20

B) Intermediate Hole Casing Data				
Size	Weight	Type	Connection	Plan Set Depth
7”	29# & 32#	HCP-110	LTC	EOC: 9967
	32# will be run through salt sections ~ 7420 – 8405 MD			

C) Intermediate Hole Cement Data				
Slurry / Fluid	Weight	Yield (ft3/sk)	Total Sxs / Bbl	Top of Cement
Spacer Fluid	10.5		NA / 20	NA
Scavenger	9.04	10.39	75	NA
Water Spacer	8.33		NA / 20	NA
Lead	11.8	2.55	200	4495
Tail	15.6	1.56	360	7100

8. **Production Hole Data**: A) Drilling Fluid, B) Liner Data, C) Cement Data

A) Production Hole Drill Fluid Data				
Fluid Type	MW Range	Funnel Vis.	Yield Point	Water Loss
Brine	9.8 – 10.2	29 – 32	As Needed	NC

B) Production Hole Liner Data				
Size	Weight	Type	Connection	Plan Set Depth
4 ½”	13.5#	P-110	LTC	TD: 19401
	Completion string with frac sleeves and swell packers			

C) Production Hole Cement Data – NA
Completion String will not be cemented

9. Proposed Logs
    a. Will submit Form 4 - Open ole Log Waiver. The Agnes Burns #1 is a Red River offset well that is to the north within 1 mile. Borehole Compensated Sonic and Lateral Gamma Ray are on file for the offset well.
        i. If our Form 4 is denied we will run DLL/GR/SP/DENSITY/NEUTRON/SONIC – vertical open hole to KOP
    b. CBL – 7” casing
    c. GAMMA (LWD) – 8 ¾” curve and 6” lateral

10. Directional Surveys
    a. Vertical Hole – every 90’
    b. 8 ¾” Curve – every 30’
    c. 6” Lateral – every 30’ to 90’

Database:	EDM 2003.16 Single User Db	**Local Co-ordinate Reference:**	Well Muller 1-21-16H
Company:	G3 Operating, LLC	**TVD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Project:	Williams Co., ND	**MD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Site:	Sec.21-T158N-R103W	**North Reference:**	True
Well:	Muller 1-21-16H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,575.0	1,575.0	Pierre/base foxhills		0.00	
4,275.0	4,275.0	Greenhorn		0.00	
4,995.0	4,995.0	Dakota (marine)		0.00	
5,975.0	5,975.0	Rierdon		0.00	
6,580.0	6,580.0	Spearfish		0.00	
6,755.0	6,755.0	Minnelusa		0.00	
7,200.0	7,200.0	Otter		0.00	
7,476.0	7,476.0	Kibbey Lime		0.00	
7,620.0	7,620.0	Charles Salt		0.00	
8,205.0	8,205.0	Base last Charles Salt		0.00	
8,390.0	8,390.0	Mission Canyon		0.00	
9,080.0	9,080.0	Lodgepole		0.00	
9,797.3	9,615.0	Upper Bakken Shale		0.00	
9,835.8	9,625.0	Top of Middle Bakken		0.00	
9,967.0	9,640.0	Target		0.00	
	9,660.0	Base of Middle Bakken		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
9,067.0	9,067.0	0.0	0.0	KOP / Start Build 10.00°
9,967.0	9,640.0	573.0	2.6	Start 9434.3 hold at 9967.0 MD
19,401.3	9,640.0	10,007.2	46.1	TD at 19401.3

Company: G3 Operating, LLC
Field: Williams Co., ND
Location: Sec.21-T158N-R103W
Well: Muller 1-21-16H
Wellbore #1
Plan: Plan #1 (Muller 1-21-16H/Wellbore #1)

PATHFINDER
A Schlumberger Company

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	9067.0	0.00	0.00	9067.0	0.0	0.0	0.00	0.00	0.0	
3	9967.0	90.00	0.26	9640.0	573.0	2.6	10.00	0.26	573.0	PBHL Muller 1-21-16H
4	19401.3	90.00	0.26	9640.0	10007.2	46.1	0.00	0.00	10007.3	PBHL Muller 1-21-16H

WELL DETAILS: Muller 1-21-16H

Ground Level: 2260.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	562849.05	1117595.89	48° 29' 23.380 N	104° 0' 36.500 W	

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
PBHL Muller 1-21-16H	9640.0	10007.2	46.1	Point

ANNOTATIONS

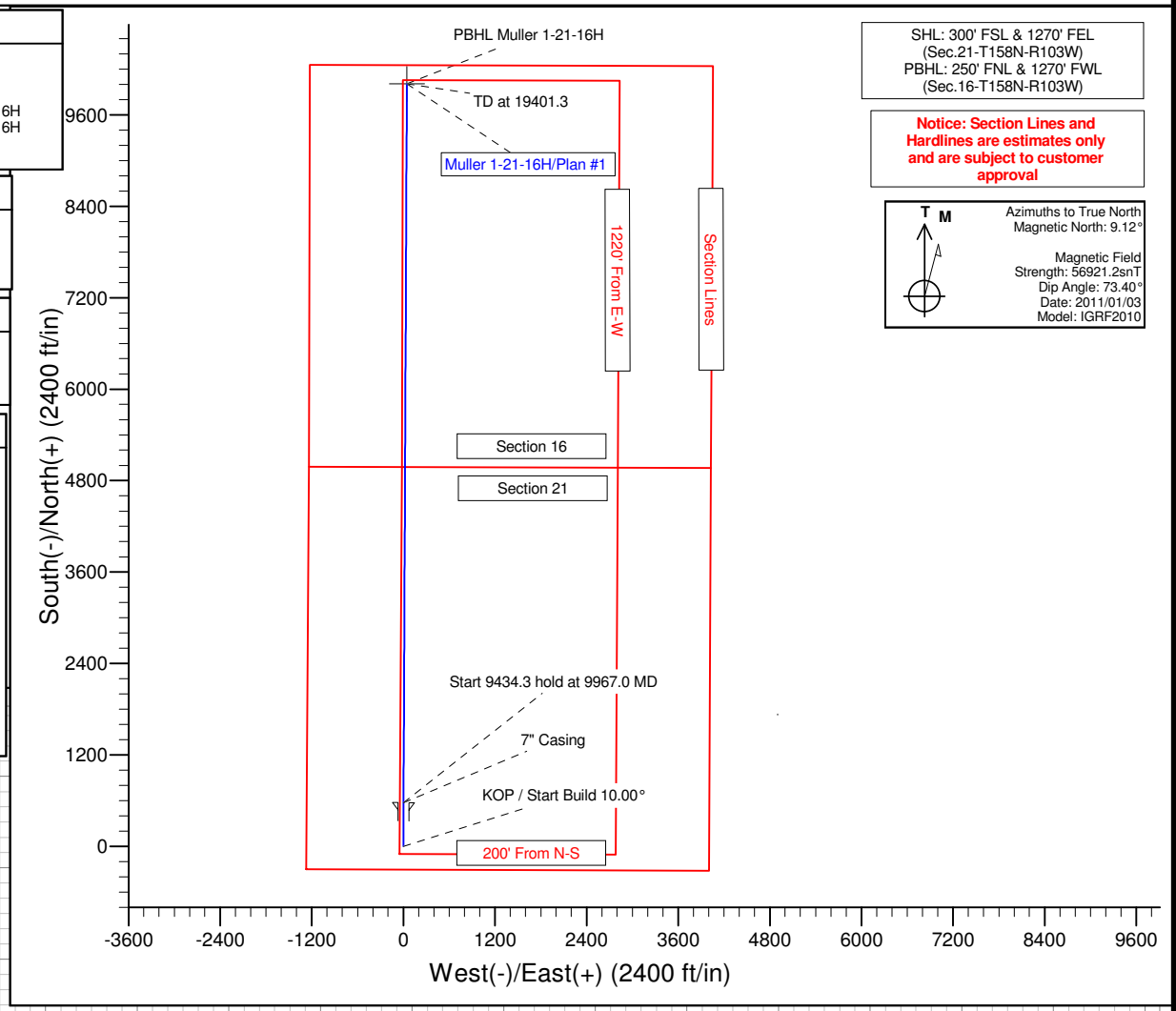
TVD	MD	Annotation
9067.0	9067.0	KOP / Start Build 10.00°
9640.0	9967.0	Start 9434.3 hold at 9967.0 MD
9640.0	19401.3	TD at 19401.3

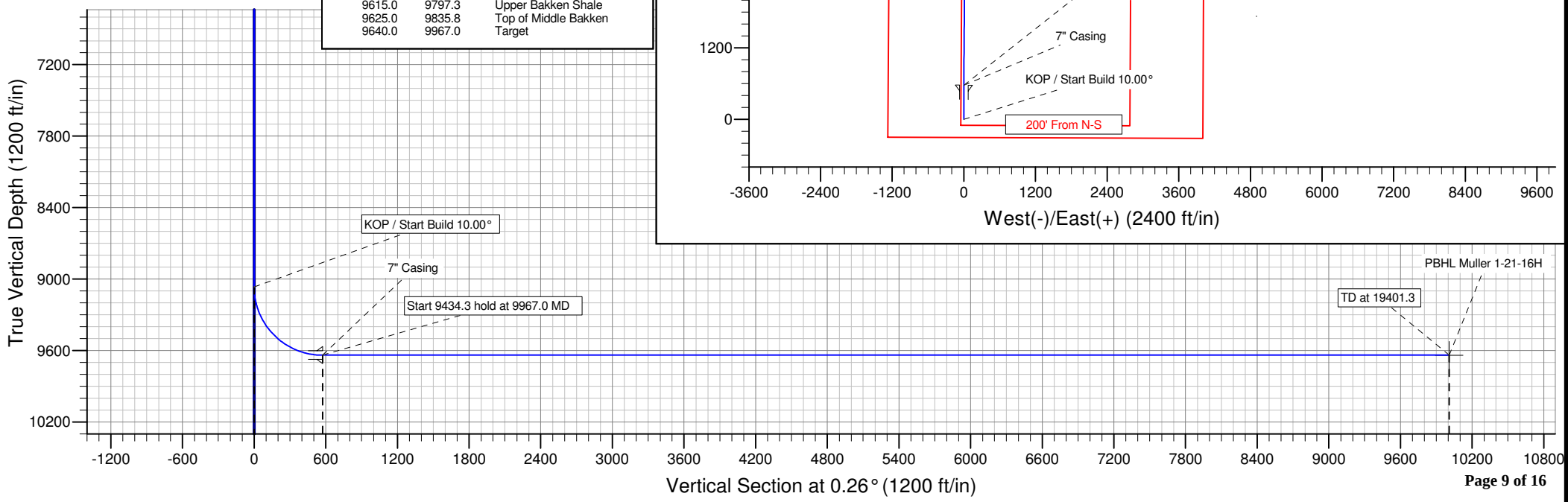
CASING DETAILS

TVD	MD	Name	Size
9640.0	9967.0	7" Casing	7

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1575.0	1575.0	Pierre/base foxhills
4275.0	4275.0	Greenhorn
4995.0	4995.0	Dakota (marine)
5975.0	5975.0	Rierdon
6580.0	6580.0	Spearfish
6755.0	6755.0	Minnelusa
7200.0	7200.0	Otter
7476.0	7476.0	Kibbey Lime
7620.0	7620.0	Charles Salt
8205.0	8205.0	Base last Charles Salt
8390.0	8390.0	Mission Canyon
9080.0	9080.0	Lodgepole
9615.0	9797.3	Upper Bakken Shale
9625.0	9835.8	Top of Middle Bakken
9640.0	9967.0	Target





Database:	EDM 2003.16 Single User Db	**Local Co-ordinate Reference:**	Well Muller 1-21-16H
Company:	G3 Operating, LLC	**TVD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Project:	Williams Co., ND	**MD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Site:	Sec.21-T158N-R103W	**North Reference:**	True
Well:	Muller 1-21-16H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Project Williams Co., ND

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	North Dakota Northern Zone		

Site Sec.21-T158N-R103W

Site Position:		**Northing:**	562,849.05 ft	**Latitude:**	48° 29' 23.380 N
From:	Lat/Long	**Easting:**	1,117,595.89 ft	**Longitude:**	104° 0' 36.500 W
Position Uncertainty:	0.0 ft	**Slot Radius:**	"	**Grid Convergence:**	-2.61 °

Well Muller 1-21-16H

Well Position	**+N/-S**	0.0 ft	**Northing:**	562,849.05 ft	**Latitude:**	48° 29' 23.380 N
	+E/-W	0.0 ft	**Easting:**	1,117,595.89 ft	**Longitude:**	104° 0' 36.500 W
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	2,260.0 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2011/01/03	9.12	73.40	56,921

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	0.26

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
9,067.0	0.00	0.00	9,067.0	0.0	0.0	0.00	0.00	0.00	0.00	
9,967.0	90.00	0.26	9,640.0	573.0	2.6	10.00	10.00	0.00	0.26	PBHL Muller 1-21-16H
19,401.3	90.00	0.26	9,640.0	10,007.2	46.1	0.00	0.00	0.00	0.00	PBHL Muller 1-21-16H

Database:	EDM 2003.16 Single User Db	**Local Co-ordinate Reference:**	Well Muller 1-21-16H
Company:	G3 Operating, LLC	**TVD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Project:	Williams Co., ND	**MD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Site:	Sec.21-T158N-R103W	**North Reference:**	True
Well:	Muller 1-21-16H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Pierre/base foxhills									
1,575.0	0.00	0.00	1,575.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
Greenhorn									
4,275.0	0.00	0.00	4,275.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	EDM 2003.16 Single User Db	**Local Co-ordinate Reference:**	Well Muller 1-21-16H
Company:	G3 Operating, LLC	**TVD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Project:	Williams Co., ND	**MD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Site:	Sec.21-T158N-R103W	**North Reference:**	True
Well:	Muller 1-21-16H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
Dakota (marine)									
4,995.0	0.00	0.00	4,995.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
Rierdon									
5,975.0	0.00	0.00	5,975.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Spearfish									
6,580.0	0.00	0.00	6,580.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
Minnelusa									
6,755.0	0.00	0.00	6,755.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
Otter									
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
Kibbey Lime									
7,476.0	0.00	0.00	7,476.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
Charles Salt									
7,620.0	0.00	0.00	7,620.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
Base last Charles Salt									
8,205.0	0.00	0.00	8,205.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
Mission Canyon									
8,390.0	0.00	0.00	8,390.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	EDM 2003.16 Single User Db	**Local Co-ordinate Reference:**	Well Muller 1-21-16H
Company:	G3 Operating, LLC	**TVD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Project:	Williams Co., ND	**MD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Site:	Sec.21-T158N-R103W	**North Reference:**	True
Well:	Muller 1-21-16H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP / Start Build 10.00°									
9,067.0	0.00	0.00	9,067.0	0.0	0.0	0.0	0.00	0.00	0.00
Lodgepole									
9,080.0	1.30	0.26	9,080.0	0.1	0.0	0.1	10.00	10.00	0.00
9,100.0	3.30	0.26	9,100.0	1.0	0.0	1.0	10.00	10.00	0.00
9,150.0	8.30	0.26	9,149.7	6.0	0.0	6.0	10.00	10.00	0.00
9,200.0	13.30	0.26	9,198.8	15.4	0.1	15.4	10.00	10.00	0.00
9,250.0	18.30	0.26	9,246.9	29.0	0.1	29.0	10.00	10.00	0.00
9,300.0	23.30	0.26	9,293.6	46.7	0.2	46.7	10.00	10.00	0.00
9,350.0	28.30	0.26	9,338.6	68.5	0.3	68.5	10.00	10.00	0.00
9,400.0	33.30	0.26	9,381.6	94.1	0.4	94.1	10.00	10.00	0.00
9,450.0	38.30	0.26	9,422.1	123.3	0.6	123.3	10.00	10.00	0.00
9,500.0	43.30	0.26	9,459.9	156.0	0.7	156.0	10.00	10.00	0.00
9,550.0	48.30	0.26	9,494.8	191.8	0.9	191.8	10.00	10.00	0.00
9,600.0	53.30	0.26	9,526.4	230.5	1.1	230.5	10.00	10.00	0.00
9,650.0	58.30	0.26	9,554.5	271.9	1.3	271.9	10.00	10.00	0.00
9,700.0	63.30	0.26	9,578.9	315.5	1.5	315.5	10.00	10.00	0.00
9,750.0	68.30	0.26	9,599.4	361.1	1.7	361.1	10.00	10.00	0.00
Upper Bakken Shale									
9,797.3	73.03	0.26	9,615.0	405.7	1.9	405.7	10.00	10.00	0.00
9,800.0	73.30	0.26	9,615.8	408.3	1.9	408.3	10.00	10.00	0.00
Top of Middle Bakken									
9,835.8	76.88	0.26	9,625.0	442.9	2.0	442.9	10.00	10.00	0.00
9,850.0	78.30	0.26	9,628.1	456.8	2.1	456.8	10.00	10.00	0.00
9,900.0	83.30	0.26	9,636.0	506.1	2.3	506.1	10.00	10.00	0.00
9,950.0	88.30	0.26	9,639.7	556.0	2.6	556.0	10.00	10.00	0.00
Start 9434.3 hold at 9967.0 MD - Target - 7" Casing									
9,967.0	90.00	0.26	9,640.0	573.0	2.6	573.0	10.00	10.00	0.00
10,000.0	90.00	0.26	9,640.0	606.0	2.8	606.0	0.00	0.00	0.00
10,100.0	90.00	0.26	9,640.0	706.0	3.3	706.0	0.00	0.00	0.00
10,200.0	90.00	0.26	9,640.0	805.9	3.7	806.0	0.00	0.00	0.00
10,300.0	90.00	0.26	9,640.0	905.9	4.2	906.0	0.00	0.00	0.00
10,400.0	90.00	0.26	9,640.0	1,005.9	4.6	1,006.0	0.00	0.00	0.00
10,500.0	90.00	0.26	9,640.0	1,105.9	5.1	1,106.0	0.00	0.00	0.00
10,600.0	90.00	0.26	9,640.0	1,205.9	5.6	1,206.0	0.00	0.00	0.00
10,700.0	90.00	0.26	9,640.0	1,305.9	6.0	1,306.0	0.00	0.00	0.00
10,800.0	90.00	0.26	9,640.0	1,405.9	6.5	1,406.0	0.00	0.00	0.00
10,900.0	90.00	0.26	9,640.0	1,505.9	6.9	1,506.0	0.00	0.00	0.00
11,000.0	90.00	0.26	9,640.0	1,605.9	7.4	1,606.0	0.00	0.00	0.00
11,100.0	90.00	0.26	9,640.0	1,705.9	7.9	1,706.0	0.00	0.00	0.00
11,200.0	90.00	0.26	9,640.0	1,805.9	8.3	1,806.0	0.00	0.00	0.00
11,300.0	90.00	0.26	9,640.0	1,905.9	8.8	1,906.0	0.00	0.00	0.00
11,400.0	90.00	0.26	9,640.0	2,005.9	9.2	2,006.0	0.00	0.00	0.00
11,500.0	90.00	0.26	9,640.0	2,105.9	9.7	2,106.0	0.00	0.00	0.00
11,600.0	90.00	0.26	9,640.0	2,205.9	10.2	2,206.0	0.00	0.00	0.00
11,700.0	90.00	0.26	9,640.0	2,305.9	10.6	2,306.0	0.00	0.00	0.00
11,800.0	90.00	0.26	9,640.0	2,405.9	11.1	2,406.0	0.00	0.00	0.00

Database:	EDM 2003.16 Single User Db	**Local Co-ordinate Reference:**	Well Muller 1-21-16H
Company:	G3 Operating, LLC	**TVD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Project:	Williams Co., ND	**MD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Site:	Sec.21-T158N-R103W	**North Reference:**	True
Well:	Muller 1-21-16H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
11,900.0	90.00	0.26	9,640.0	2,505.9	11.5	2,506.0	0.00	0.00	0.00
12,000.0	90.00	0.26	9,640.0	2,605.9	12.0	2,606.0	0.00	0.00	0.00
12,100.0	90.00	0.26	9,640.0	2,705.9	12.5	2,706.0	0.00	0.00	0.00
12,200.0	90.00	0.26	9,640.0	2,805.9	12.9	2,806.0	0.00	0.00	0.00
12,300.0	90.00	0.26	9,640.0	2,905.9	13.4	2,906.0	0.00	0.00	0.00
12,400.0	90.00	0.26	9,640.0	3,005.9	13.8	3,006.0	0.00	0.00	0.00
12,500.0	90.00	0.26	9,640.0	3,105.9	14.3	3,106.0	0.00	0.00	0.00
12,600.0	90.00	0.26	9,640.0	3,205.9	14.8	3,206.0	0.00	0.00	0.00
12,700.0	90.00	0.26	9,640.0	3,305.9	15.2	3,306.0	0.00	0.00	0.00
12,800.0	90.00	0.26	9,640.0	3,405.9	15.7	3,406.0	0.00	0.00	0.00
12,900.0	90.00	0.26	9,640.0	3,505.9	16.2	3,506.0	0.00	0.00	0.00
13,000.0	90.00	0.26	9,640.0	3,605.9	16.6	3,606.0	0.00	0.00	0.00
13,100.0	90.00	0.26	9,640.0	3,705.9	17.1	3,706.0	0.00	0.00	0.00
13,200.0	90.00	0.26	9,640.0	3,805.9	17.5	3,806.0	0.00	0.00	0.00
13,300.0	90.00	0.26	9,640.0	3,905.9	18.0	3,906.0	0.00	0.00	0.00
13,400.0	90.00	0.26	9,640.0	4,005.9	18.5	4,006.0	0.00	0.00	0.00
13,500.0	90.00	0.26	9,640.0	4,105.9	18.9	4,106.0	0.00	0.00	0.00
13,600.0	90.00	0.26	9,640.0	4,205.9	19.4	4,206.0	0.00	0.00	0.00
13,700.0	90.00	0.26	9,640.0	4,305.9	19.8	4,306.0	0.00	0.00	0.00
13,800.0	90.00	0.26	9,640.0	4,405.9	20.3	4,406.0	0.00	0.00	0.00
13,900.0	90.00	0.26	9,640.0	4,505.9	20.8	4,506.0	0.00	0.00	0.00
14,000.0	90.00	0.26	9,640.0	4,605.9	21.2	4,606.0	0.00	0.00	0.00
14,100.0	90.00	0.26	9,640.0	4,705.9	21.7	4,706.0	0.00	0.00	0.00
14,200.0	90.00	0.26	9,640.0	4,805.9	22.1	4,806.0	0.00	0.00	0.00
14,300.0	90.00	0.26	9,640.0	4,905.9	22.6	4,906.0	0.00	0.00	0.00
14,400.0	90.00	0.26	9,640.0	5,005.9	23.1	5,006.0	0.00	0.00	0.00
14,500.0	90.00	0.26	9,640.0	5,105.9	23.5	5,106.0	0.00	0.00	0.00
14,600.0	90.00	0.26	9,640.0	5,205.9	24.0	5,206.0	0.00	0.00	0.00
14,700.0	90.00	0.26	9,640.0	5,305.9	24.4	5,306.0	0.00	0.00	0.00
14,800.0	90.00	0.26	9,640.0	5,405.9	24.9	5,406.0	0.00	0.00	0.00
14,900.0	90.00	0.26	9,640.0	5,505.9	25.4	5,506.0	0.00	0.00	0.00
15,000.0	90.00	0.26	9,640.0	5,605.9	25.8	5,606.0	0.00	0.00	0.00
15,100.0	90.00	0.26	9,640.0	5,705.9	26.3	5,706.0	0.00	0.00	0.00
15,200.0	90.00	0.26	9,640.0	5,805.9	26.7	5,806.0	0.00	0.00	0.00
15,300.0	90.00	0.26	9,640.0	5,905.9	27.2	5,906.0	0.00	0.00	0.00
15,400.0	90.00	0.26	9,640.0	6,005.9	27.7	6,006.0	0.00	0.00	0.00
15,500.0	90.00	0.26	9,640.0	6,105.9	28.1	6,106.0	0.00	0.00	0.00
15,600.0	90.00	0.26	9,640.0	6,205.9	28.6	6,206.0	0.00	0.00	0.00
15,700.0	90.00	0.26	9,640.0	6,305.9	29.0	6,306.0	0.00	0.00	0.00
15,800.0	90.00	0.26	9,640.0	6,405.9	29.5	6,406.0	0.00	0.00	0.00
15,900.0	90.00	0.26	9,640.0	6,505.9	30.0	6,506.0	0.00	0.00	0.00
16,000.0	90.00	0.26	9,640.0	6,605.9	30.4	6,606.0	0.00	0.00	0.00
16,100.0	90.00	0.26	9,640.0	6,705.9	30.9	6,706.0	0.00	0.00	0.00
16,200.0	90.00	0.26	9,640.0	6,805.9	31.4	6,806.0	0.00	0.00	0.00
16,300.0	90.00	0.26	9,640.0	6,905.9	31.8	6,906.0	0.00	0.00	0.00
16,400.0	90.00	0.26	9,640.0	7,005.9	32.3	7,006.0	0.00	0.00	0.00
16,500.0	90.00	0.26	9,640.0	7,105.9	32.7	7,106.0	0.00	0.00	0.00
16,600.0	90.00	0.26	9,640.0	7,205.9	33.2	7,206.0	0.00	0.00	0.00
16,700.0	90.00	0.26	9,640.0	7,305.9	33.7	7,306.0	0.00	0.00	0.00
16,800.0	90.00	0.26	9,640.0	7,405.9	34.1	7,406.0	0.00	0.00	0.00
16,900.0	90.00	0.26	9,640.0	7,505.9	34.6	7,506.0	0.00	0.00	0.00
17,000.0	90.00	0.26	9,640.0	7,605.9	35.0	7,606.0	0.00	0.00	0.00
17,100.0	90.00	0.26	9,640.0	7,705.9	35.5	7,706.0	0.00	0.00	0.00

Database:	EDM 2003.16 Single User Db	**Local Co-ordinate Reference:**	Well Muller 1-21-16H
Company:	G3 Operating, LLC	**TVD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Project:	Williams Co., ND	**MD Reference:**	WELL @ 2276.0ft (Original Well Elev)
Site:	Sec.21-T158N-R103W	**North Reference:**	True
Well:	Muller 1-21-16H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
17,200.0	90.00	0.26	9,640.0	7,805.9	36.0	7,806.0	0.00	0.00	0.00
17,300.0	90.00	0.26	9,640.0	7,905.9	36.4	7,906.0	0.00	0.00	0.00
17,400.0	90.00	0.26	9,640.0	8,005.9	36.9	8,006.0	0.00	0.00	0.00
17,500.0	90.00	0.26	9,640.0	8,105.9	37.3	8,106.0	0.00	0.00	0.00
17,600.0	90.00	0.26	9,640.0	8,205.9	37.8	8,206.0	0.00	0.00	0.00
17,700.0	90.00	0.26	9,640.0	8,305.9	38.3	8,306.0	0.00	0.00	0.00
17,800.0	90.00	0.26	9,640.0	8,405.9	38.7	8,406.0	0.00	0.00	0.00
17,900.0	90.00	0.26	9,640.0	8,505.9	39.2	8,506.0	0.00	0.00	0.00
18,000.0	90.00	0.26	9,640.0	8,605.9	39.6	8,606.0	0.00	0.00	0.00
18,100.0	90.00	0.26	9,640.0	8,705.9	40.1	8,706.0	0.00	0.00	0.00
18,200.0	90.00	0.26	9,640.0	8,805.9	40.6	8,806.0	0.00	0.00	0.00
18,300.0	90.00	0.26	9,640.0	8,905.9	41.0	8,906.0	0.00	0.00	0.00
18,400.0	90.00	0.26	9,640.0	9,005.9	41.5	9,006.0	0.00	0.00	0.00
18,500.0	90.00	0.26	9,640.0	9,105.9	41.9	9,106.0	0.00	0.00	0.00
18,600.0	90.00	0.26	9,640.0	9,205.9	42.4	9,206.0	0.00	0.00	0.00
18,700.0	90.00	0.26	9,640.0	9,305.9	42.9	9,306.0	0.00	0.00	0.00
18,800.0	90.00	0.26	9,640.0	9,405.9	43.3	9,406.0	0.00	0.00	0.00
18,900.0	90.00	0.26	9,640.0	9,505.9	43.8	9,506.0	0.00	0.00	0.00
19,000.0	90.00	0.26	9,640.0	9,605.9	44.3	9,606.0	0.00	0.00	0.00
19,100.0	90.00	0.26	9,640.0	9,705.9	44.7	9,706.0	0.00	0.00	0.00
19,200.0	90.00	0.26	9,640.0	9,805.9	45.2	9,806.0	0.00	0.00	0.00
19,300.0	90.00	0.26	9,640.0	9,905.9	45.6	9,906.0	0.00	0.00	0.00
TD at 19401.3 - PBHL Muller 1-21-16H - PBHL Muller 1-21-16H									
19,401.3	90.00	0.26	9,640.0	10,007.2	46.1	10,007.3	0.00	0.00	0.00

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
PBHL Muller 1-21-16H - plan hits target center - Point	0.00	0.00	9,640.0	10,007.2	46.1	572,843.75	1,118,097.99	48° 31' 2.131 N	104° 0' 35.815 W

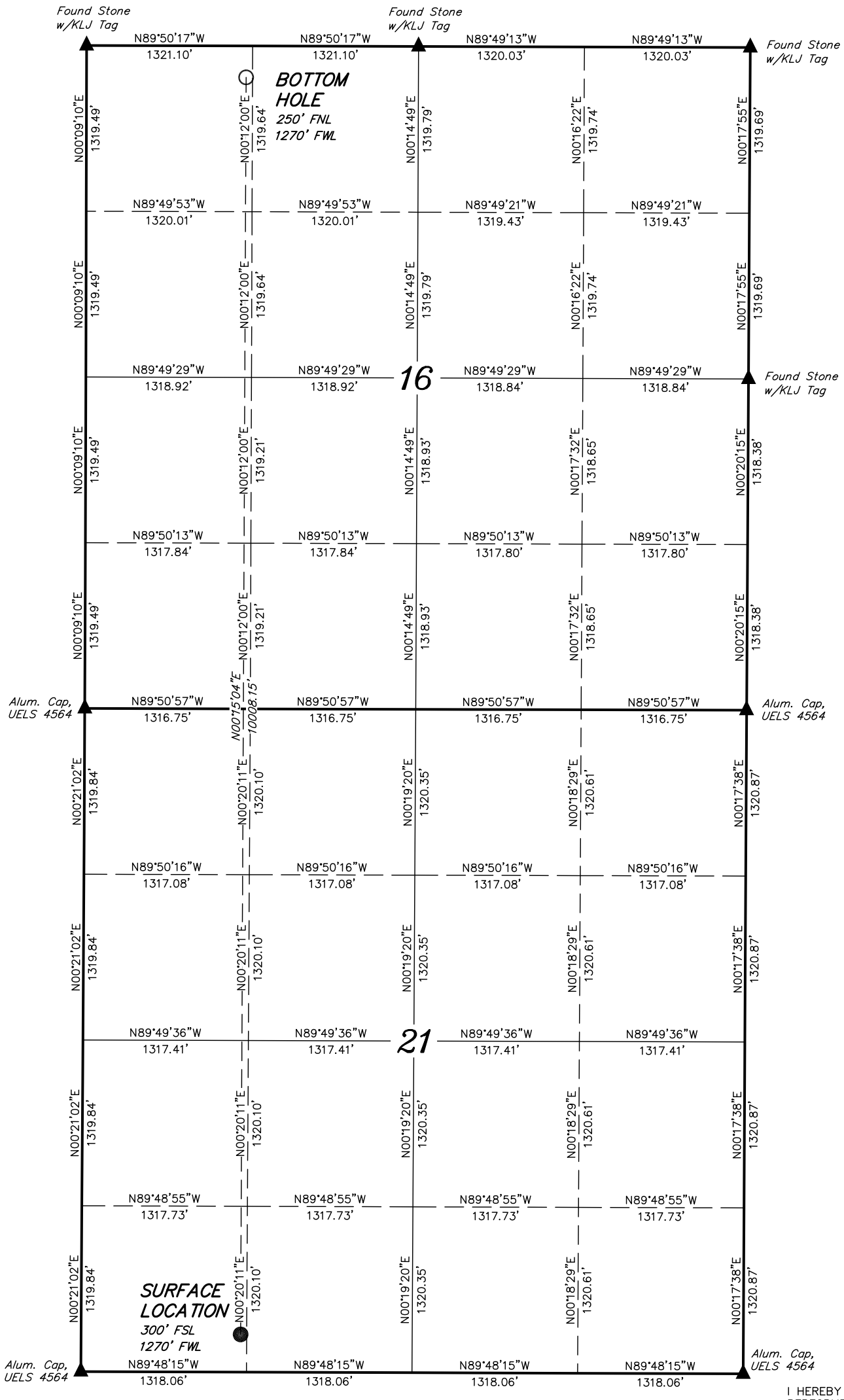
Casing Points

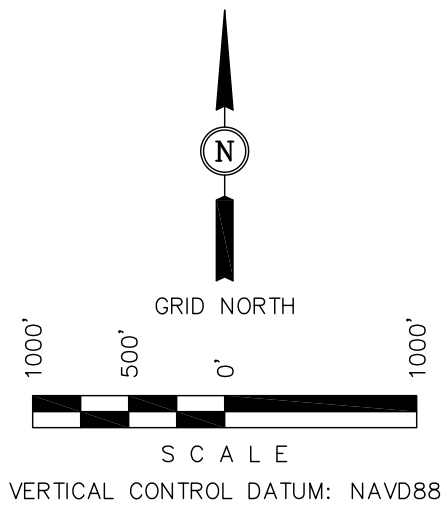
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
9,967.0	9,640.0	7" Casing	7	8-3/4

SECTION BREAKDOWN
T158N, R103W, 5th P.M.

G3 OPERATING, LLC

Well location, Muller #1-21-16H, located as shown in the SW 1/4 SW 1/4 of Section 21, T158N, R103W, 5th P.M., Williams County, North Dakota.





CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

TROY JENSEN
REGISTERED LAND SURVEYOR
L.S. 4654
NORTH DAKOTA

REGISTERED LAND SURVEYOR
REGISTRATION NO. 4654
STATE OF NORTH DAKOTA

LEGEND:

└ = 90° SYMBOL

● = PROPOSED WELL HEAD.

▲ = SECTION CORNERS LOCATED.

[derived from: N.G.S. O.P.U.S. Solution REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000)]

NAD 83 (TARGET BOTTOM HOLE)	NAD 83 (SURFACE LOCATION)
LATITUDE = 48°31'02.12" (48.517256) LONGITUDE = 104°00'36.47" (104.010131)	LATITUDE = 48°29'23.38" (48.489828) LONGITUDE = 104°00'36.50" (104.010139)
NAD 27 (TARGET BOTTOM HOLE)	**NAD 27 (SURFACE LOCATION)**
LATITUDE = 48°31'02.03" (48.517231) LONGITUDE = 104°00'34.71" (104.009642)	LATITUDE = 48°29'23.29" (48.489803) LONGITUDE = 104°00'34.74" (104.009650)

UINTAH ENGINEERING & LAND SURVEYING
85 SOUTH 200 EAST - VERNAL, UTAH 84078
(435) 789-1017

SCALE 1" = 1000'	DATE SURVEYED: 11-12-10	DATE DRAWN: 12-15-10
PARTY S.A. M.N. S.B.	REFERENCES G.L.O. PLAT	
WEATHER COLD	FILE G3 OPERATING, LLC	

G3 OPERATING, LLC

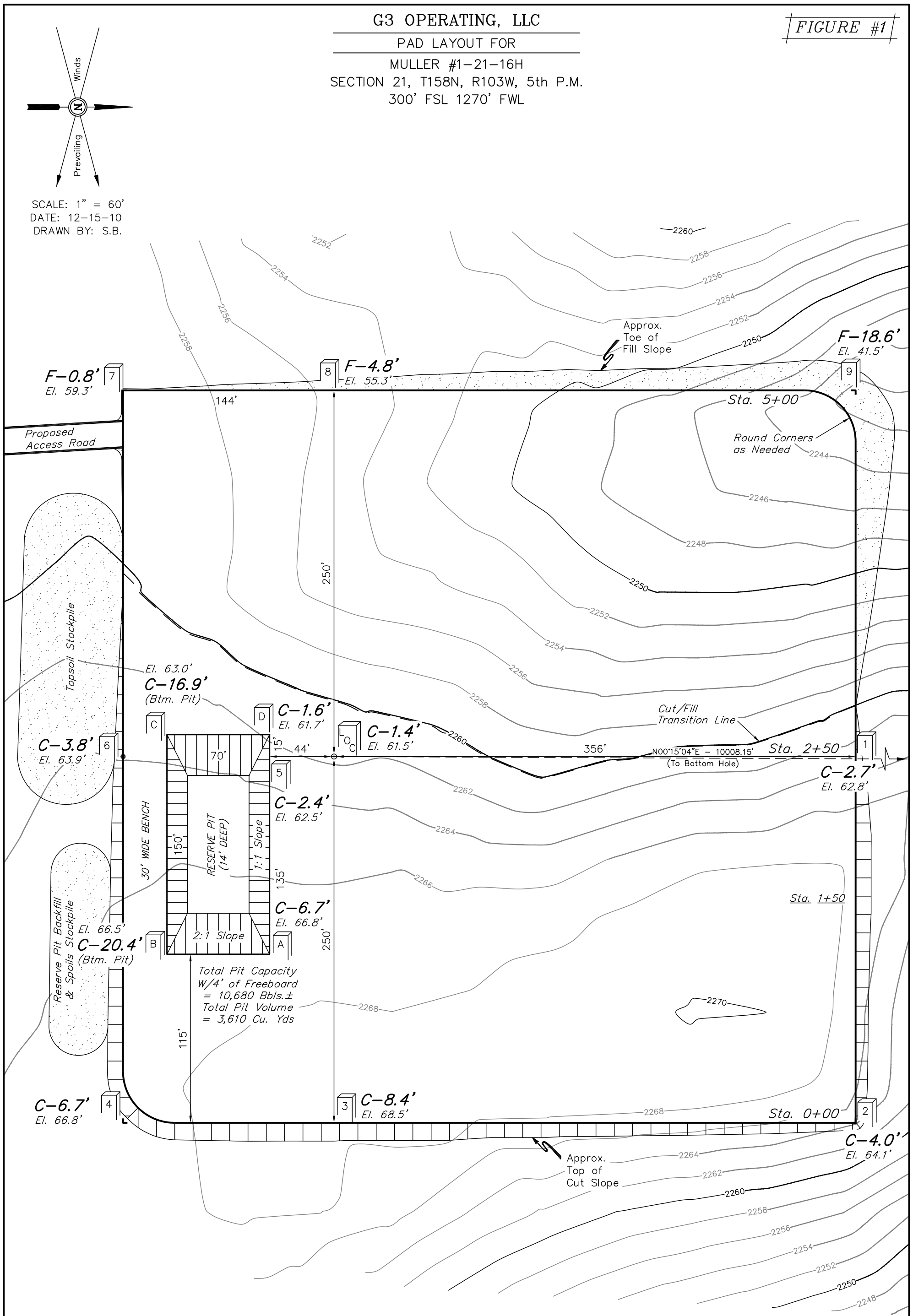
PAD LAYOUT FOR

MULLER #1–21–16H

SECTION 21, T158N, R103W, 5th P.M.

300' FSL 1270' FWL

FIGURE #1



Elev. Ungraded Ground At Loc. Stake = 2261.5'

FINISHED GRADE ELEV. AT LOC. STAKE = 2260.1'

UINTAH ENGINEERING & LAND SURVEYING

85 So. 200 East * Vernal, Utah 84078 * (435) 789–1017

1" = 40'
X-Section Scale
1" = 100'

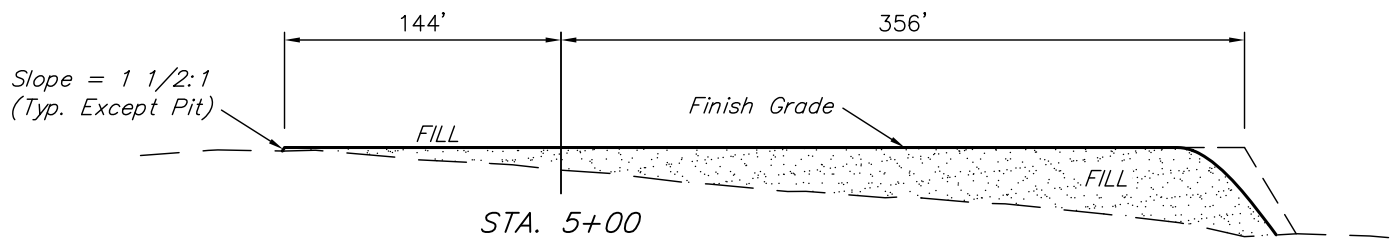
DATE: 12-15-10
DRAWN BY: S.B.

G3 OPERATING, LLC

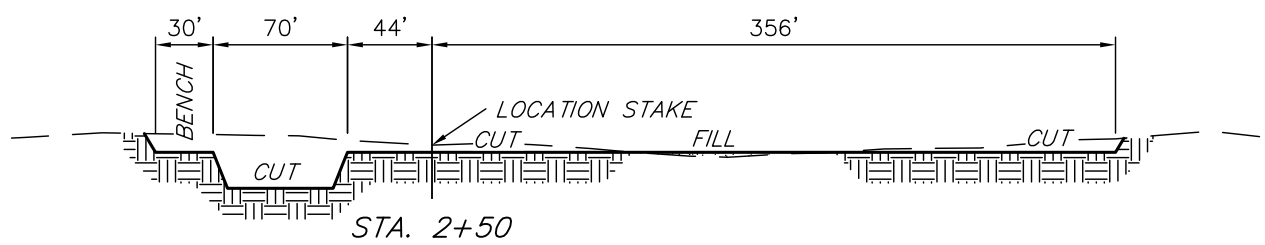
TYPICAL CROSS SECTION FOR

MULLER #1-21-16H
SECTION 21, T158N, R103W, 5th P.M.
300' FSL 1270' FWL

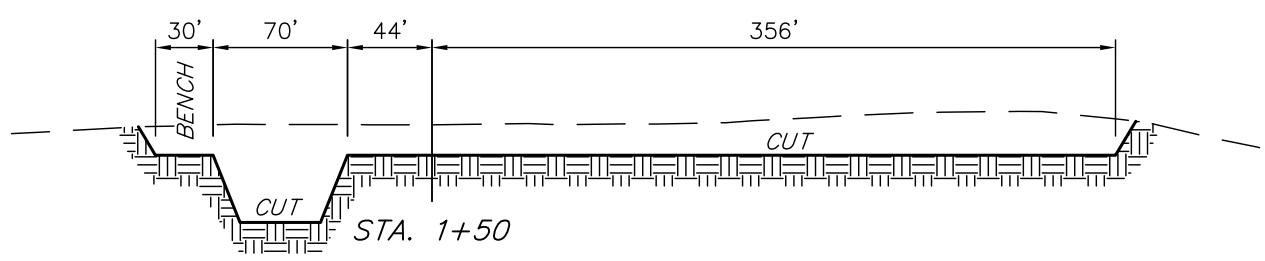
FIGURE #2



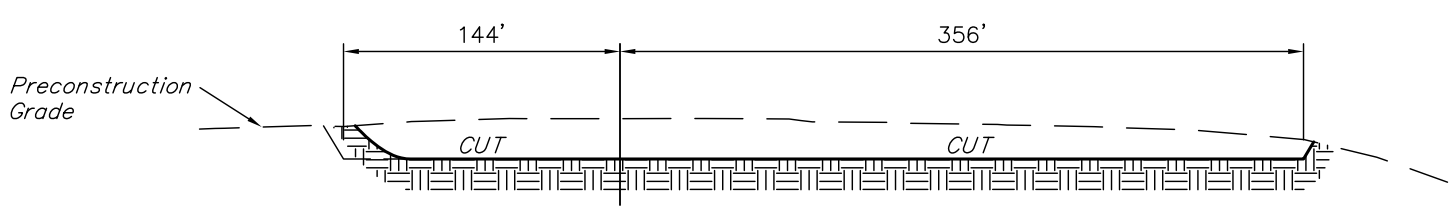
STA. 5+00



STA. 2+50



STA. 1+50



STA. 0+00

NOTE:
Topsoil should not be Stripped Below Finished Grade on Substructure Area.

APPROXIMATE ACREAGES

WELL SITE DISTURBANCE	*= ± 6.646 ACRES*
ACCESS ROAD DISTURBANCE	*= ± 2.981 ACRES*
TOTAL	*= ± 9.627 ACRES*

** NOTE:*
FILL QUANTITY INCLUDES 5% FOR COMPACTION

APPROXIMATE YARDAGES

(6") Topsoil Stripping	= *5,080* Cu. Yds.	EXCESS MATERIAL	= *6,880* Cu. Yds.
Remaining Location	= *30,720* Cu. Yds.	Topsoil & Pit Backfill (1/2 Pit Vol.)	= *6,880* Cu. Yds.
Reserve Pit Cut	= *3,610* Cu. Yds.		
TOTAL CUT	= *39,410* CU.YDS.	EXCESS UNBALANCE (After Interim Rehabilitation)	= *0* Cu. Yds.
FILL	= *32,530* CU.YDS.		

UINTAH ENGINEERING & LAND SURVEYING
*85 So. 200 East * Vernal, Utah 84078 * (435) 789-1017*

G3 OPERATING, LLC
MULLER #1-21-16H
SECTION 21, T158N, R103W, 5th P.M.

PROCEED IN A SOUTHERLY DIRECTION FROM GRENORA, NORTH DAKOTA ALONG HIGHWAY 5 APPROXIMATELY 8.4 MILES TO THE JUNCTION OF THIS ROAD AND HIGHWAY 10A TO THE WEST; TURN RIGHT AND PROCEED IN A WESTERLY DIRECTION APPROXIMATELY 2.0 MILES TO THE JUNCTION OF THIS ROAD AND 153rd AVE. NW TO THE SOUTH; TURN LEFT AND PROCEED IN A SOUTHERLY DIRECTION APPROXIMATELY 1.0 MILES TO THE BEGINNING OF THE PROPOSED ACCESS TO THE WEST; FOLLOW ROAD FLAGS IN A WESTERLY DIRECTION APPROXIMATELY 4328' TO THE PROPOSED LOCATION.

TOTAL DISTANCE FROM GRENORA, NORTH DAKOTA TO THE PROPOSED WELL LOCATION IS APPROXIMATELY 12.2 MILES.